

# linux and tools for LANDISK(SH4)

<http://eggplant.ddo.jp/www/pukiwiki/index.php?linux%20and%20tools%20for%20LANDISK%28SH4%29>

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## Target Hardware

- IO-DATA LANDISK Series

This project's goal is to turn the IO-Data Network Attached Storage device into an freely accessible Linux box. The device is available in several configurations:

- JP model [HDL-U Series\(Production end in March, 2006\)](#), [LAN Tank](#)
- US model [UHDL-160U](#), [UHDL-300U](#)
- EU model (OEM) [PX-EH25L](#), [PX-EH40L](#) (landisk\_telnetd\_v2.0.zip is available.)
- Storage-less model(compact flash media (Micro Drive) model) [USL-5P](#)

- Specification

- Processor: SH4 266MHz(SH7751R)
- Interface: 2 channels USB 2.0
- Storage Capacity: HDD 160GB (HDL-160U), 250GB, 300GB, 400GB
- Network Interface: 100BASE-TX/10BASE-T

The device comes with a Linux 2.4 inside. There is the possibility to update to 2.6 and it is also possible to install Debian in a different partition. This gives you the choice at startup to either boot as original or as a Debian system. In case of booting Debian, you will not have the original functions, like user accounts, NAS, FTP, etc, but instead a lot of other functions as you can install the software packages.

## Linux Kernel

The original OS is linux-sh-2.4.21 . A new version linux-sh-2.6.16 is available from the [linuxSH](#) homepage. The sourcecode for LANDISK target available [here](#).

## debian26 userland for SH4

- What is debian26

We are calling this userland debian26 in locals.

- debian etch at Nov 2005

- o compiled by gcc-4.0.2
- o The linuxSH kernel 2.6 image is included.
- o Xorg-X11 with USB2VGAs Support for connecting VGA display.
- o About 1900 debian packages compiled for SH4 can be used.

	Archive	Remarks
base(etch)	<a href="#">base26-sh4-20060329-etch.tgz</a>	linux-2.6.16-landisk.0.1 & landisk-tools-20051110 included
kernel source	<a href="#">linux-2.6.16-sh-landisk.0.1.tgz</a>	linux-2.6.16.1 + LinuxSH

- base26-sh4-xxxxxxx-etch.tgz archive contains the following.

```

Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Installed/Config-files/Unpacked/Failed-config/Half-installed
|/ Err?=(none)/Hold/Reinst-required/X=both-problems (Status,Err: uppercase=bad)
||/ Name                               Version                               Description
+++-----
ii  adduser                               3.77                                  Add and remove users and groups
ii  apt                                     0.6.42.1                              Advanced front-end for dpkg
ii  apt-utils                              0.6.42.1                              APT utility programs
ii  aptitude                               0.2.15.9-7                            terminal-based apt frontend
ii  at                                       3.1.9                                  Delayed job execution and batch processing
ii  base-config                             2.73                                    Debian base system configurator
ii  base-files                              3.1.9                                  Debian base system miscellaneous files
ii  base-passwd                             3.5.10                                 Debian base system master password and group
ii  bash                                    3.0-17                                 The GNU Bourne Again SHell
ii  bsdmainutils                            6.1.2                                  collection of more utilities from FreeBSD
ii  bsduutils                               2.12p-8                                Basic utilities from 4.4BSD-Lite
ii  console-common                          0.7.54                                 Basic infrastructure for text console config
ii  console-data                            2002.12.04dbs-49                       Keymaps, fonts, charset maps, fallback table
ii  console-tools                           0.2.3dbs-57                            Linux console and font utilities
ii  coreutils                               5.2.1-2.1                              The GNU core utilities
ii  cpio                                     2.6-9                                  GNU cpio -- a program to manage archives of
ii  cron                                     3.0p11-91                              management of regular background processing
ii  debconf                                  1.4.58                                 Debian configuration management system
ii  debconf-i18n                             1.4.58                                 full internationalization support for debcon

```


ii	debianutils	2.15	Miscellaneous utilities specific to Debian
ii	dhcp-client	2.0p15-19.1	DHCP Client
ii	diff	2.8.1-11	File comparison utilities
ii	dpkg	1.13.11	package maintenance system for Debian
ii	dselect	1.13.11	user tool to manage Debian packages
ii	e2fslibs	1.38-2	ext2 filesystem libraries
ii	e2fsprogs	1.38-2	ext2 file system utilities and libraries
ii	ed	0.2-20	The classic unix line editor
ii	exim4	4.54-1	metapackage to ease exim MTA (v4) installati
ii	exim4-base	4.54-1	support files for all exim MTA (v4) packages
ii	exim4-config	4.54-1	configuration for the exim MTA (v4)
ii	exim4-daemon-light	4.54-1	lightweight exim MTA (v4) daemon
ii	findutils	4.2.25-1	utilities for finding files--find, xargs, an
ii	gcc-4.0-base	4.0.2-2	The GNU Compiler Collection (base package)
ii	gettext-base	0.14.5-2	GNU Internationalization utilities for the b
ii	gpgv-udeb	1.4.1-1	minimal signature verification tool
ii	grep	2.5.1.ds2-2	GNU grep, egrep and fgrep
ii	groff-base	1.18.1.1-10	GNU troff text-formatting system (base syste
ii	gzip	1.3.5-12	The GNU compression utility
ii	hostname	2.91	utility to set/show the host name or domain
ii	hotplug	0.0.20040329-25	Linux Hotplug Scripts
ii	ifupdown	0.6.7	high level tools to configure network interf
ii	info	4.8-1	Standalone GNU Info documentation browser
ii	initscripts	2.86.ds1-4	Standard scripts needed for booting and shut
ii	iptables	1.3.3-2	Linux kernel 2.4+ iptables administration to
ii	iputils-ping	20020927-3	Tools to test the reachability of network ho
ii	kernel-image-2.6.16-sh	landisk.0.1	Linux kernel binary image for version 2.6.16
ii	kexec-tools	1.101-2sh	kexec tool
ii	klogd	1.4.1-17	Kernel Logging Daemon
ii	laptop-detect	0.12.1	attempt to detect a laptop
ii	libacl1	2.2.32-1	Access control list shared library
ii	libattr1	2.4.25-1	Extended attribute shared library
ii	libblkid1	1.38-2	block device id library
ii	libbz2-1.0	1.0.2-10	high-quality block-sorting file compressor l
ii	libc6	2.3.5-8	GNU C Library: Shared libraries and Timezone
ii	libcap1	1.10-14	support for getting/setting POSIX.1e capabil
ii	libcomerr2	1.38-2	common error description library
ii	libconsole	0.2.3dbs-57	Shared libraries for Linux console and font

ii	libdb2	2.7.7.0-10	The Berkeley database routines (run-time fil
ii	libdb3	3.2.9-22	Berkeley v3 Database Libraries [runtime]
ii	libdb4.2	4.2.52-18	Berkeley v4.2 Database Libraries [runtime]
ii	libdb4.3	4.3.28-2	Berkeley v4.3 Database Libraries [runtime]
ii	libgcc1	4.0.2-2	GCC support library
ii	libgcrypt11	1.2.2-1	LGPL Crypto library - runtime library
ii	libgdbm3	1.8.3-2	GNU dbm database routines (runtime version)
ii	libgnutls11	1.0.16-14	GNU TLS library - runtime library
ii	libgpg-error0	1.1-4	library for common error values and messages
ii	libident	0.22-3	simple RFC1413 client library - runtime
ii	libkrb53	1.3.6-5	MIT Kerberos runtime libraries
ii	libldap2	2.1.30-12	OpenLDAP libraries
ii	liblocale-gettext-perl	1.05-1	Using libc functions for internationalizatio
ii	liblockfile1	1.06	NFS-safe locking library, includes dotlockfi
ii	liblzol	1.08-2	data compression library
ii	libncurses5	5.4-9	Shared libraries for terminal handling
ii	libncursesw5	5.4-9	Shared libraries for terminal handling (wide
ii	libnewt0.51	0.51.6-31	Not Erik's Windowing Toolkit - text mode win
ii	libopencdk8	0.5.7-2	Open Crypto Development Kit (OpenCDK) (runti
ii	libpam-modules	0.79-3	Pluggable Authentication Modules for PAM
ii	libpam-runtime	0.79-3	Runtime support for the PAM library
ii	libpam0g	0.79-3	Pluggable Authentication Modules library
ii	libpcre3	6.4-1	Perl 5 Compatible Regular Expression Library
ii	libpopt0	1.7-5	lib for parsing cmdline parameters
ii	libsasl2	2.1.19-1.7	Authentication abstraction library
ii	libsasl2-modules	2.1.19-1.7	Pluggable Authentication Modules for SASL
ii	libselinux1	1.26-1	SELinux shared libraries
ii	libsepol1	1.8-1	Security Enhanced Linux policy library for c
ii	libsigc++-1.2-5c2	1.2.5-5	type-safe Signal Framework for C++ - runtime
ii	libslang2	2.0.4-7	The S-Lang programming library - runtime ver
ii	libss2	1.38-2	command-line interface parsing library
ii	libssl0.9.7	0.9.7g-5	SSL shared libraries
ii	libssl0.9.8	0.9.8a-3	SSL shared libraries
ii	libstdc++6	4.0.2-2	The GNU Standard C++ Library v3
ii	libtasn1-2	0.2.13-1	Manage ASN.1 structures (runtime)
ii	libtext-charwidth-perl	0.04-3	get display widths of characters on the term
ii	libtext-iconv-perl	1.4-2	converts between character sets in Perl
ii	libtext-wrapi18n-perl	0.06-4	internationalized substitute of Text::Wrap

ii	libtextwrap1	0.1-3	text-wrapping library with i18n - runtime
ii	libusb-0.1-4	0.1.10a-21	userspace USB programming library
ii	libuuid1	1.38-2	universally unique id library
ii	libwrap0	7.6.dbs-8	Wietse Venema's TCP wrappers library
ii	login	4.0.13-1	system login tools
ii	logrotate	3.7.1-2	Log rotation utility
ii	lsb-base	3.0-11	Linux Standard Base 3.0 init script function
ii	mailx	8.1.2-0.20050715cvsv-1	A simple mail user agent
ii	makedev	2.3.1-78	creates device files in /dev
ii	man-db	2.4.3-3	The on-line manual pager
ii	manpages	2.02-2	Manual pages about using a GNU/Linux system
ii	mawk	1.3.3-11	a pattern scanning and text processing langu
ii	module-init-tools	3.2-pre9-2	tools for managing Linux kernel modules
ii	modutils	2.4.27.0-3	Linux module utilities
ii	mount	2.12p-8	Tools for mounting and manipulating filesyst
ii	nano	1.3.8-2	free Pico clone with some new features
ii	ncurses-base	5.4-9	Descriptions of common terminal types
ii	ncurses-bin	5.4-9	Terminal-related programs and man pages
ii	net-tools	1.60-16	The NET-3 networking toolkit
ii	netbase	4.23	Basic TCP/IP networking system
ii	netkit-inetd	0.10-10.2	The Internet Superserver
ii	nvi	1.79-22	4.4BSD re-implementation of vi
ii	passwd	4.0.13-1	change and administer password and group dat
ii	perl-base	5.8.7-7	The Pathologically Eclectic Rubbish Lister
ii	procps	3.2.5-1	/proc file system utilities
ii	psmisc	21.6-1	Utilities that use the proc filesystem
ii	reiserfsprogs	3.6.19-1	User-level tools for ReiserFS filesystems
ii	sasl2-bin	2.1.19-1.7	Programs for manipulating the SASL users dat
ii	sed	4.1.2-8	The GNU sed stream editor
ii	slangla-utf8	1.4.9dbs-8	The S-Lang programming library with utf8 sup
ii	sysklogd	1.4.1-17	System Logging Daemon
ii	sysv-rc	2.86.ds1-4	Standard boot mechanism using symlinks in /e
ii	sysvinit	2.86.ds1-4	System-V like init
ii	tar	1.15.1-2	GNU tar
ii	tasksel	2.32	Tool for selecting tasks for installation on
ii	tcpd	7.6.dbs-8	Wietse Venema's TCP wrapper utilities
ii	telnetd	0.17-32	The telnet server
ii	util-linux	2.12p-8	Miscellaneous system utilities

ii	wget	1.10.2-1	retrieves files from the web
ii	whiptail	0.51.6-31	Displays user-friendly dialog boxes from she
ii	zlib1g	1.2.3-4	compression library - runtime

## How to setup debian26

- Adding telnetd to the original system
  - IP address is set from the menu of LANDISK.(Password is "landisk").
  - A new user "landisk" is made from the menu of LANDISK.
  - Next, download [landisk\\_telnetd\\_v2.0.zip](#) from the web site "[wizd on LANDISK](#)". (  [landisk\\_telnetd\\_v2.0.zip](#) )
  - It is unzipped and update.tgz is retrieved.
  - Update the firmware by specifying update.tgz in the menu of LANDISK.
  - After reboot, you can telnet into the device:
    - Open a telnet session, connect to the Landisk IP (port 23)
    - User account is landisk, password is "landisk".
    - To become root, "sudo su" is executed. (root password is "landisk")
    - To write it in rootfs, "mount -o rw,remount /" is executed.
- Debian26 is constructed to /dev/hda3.
  - Install debian26 base system.

```
# cd /mnt/hda3
# tar vxfzP base26-sh4-xxxxxxxx-etch.tgz
# mv debian26/* .
# rm -rf debian26
```

- Some files need to be corrected. (Following is an example based on my environment. The IP in red have to be changed according to your setup.)
  - /mnt/hda3/etc/hosts

```
127.0.0.1    localhost
192.168.1.81 landisk
```

- /mnt/hda3/etc/hostname

```
landisk
```

- /mnt/hda3/etc/resolv.conf

```
nameserver 192.168.1.1 ( <- this is your ISP's DNS server)
```

- /mnt/hda3/etc/network/interfaces

```
# Used by ifup(8) and ifdown(8). See the interfaces(5) manpage or
# /usr/share/doc/ifupdown/examples for more information.
auto lo
iface lo inet loopback

auto eth0
iface eth0 inet static
address 192.168.1.81
netmask 255.255.255.0
gateway 192.168.1.1
```

- /mnt/hda3/etc/hosts.allow

```
ALL : 127.0.0.1 192.168.1. 192.168.0.
```

- /mnt/hda3/etc/fstab

```
# UNCONFIGURED FSTAB FOR BASE SYSTEM
#/dev/hda4 / reiserfs defaults 0 1
/dev/hda3 / ext2 defaults 0 0
none /proc proc defaults 0 0
/dev/hda2 swap swap defaults 0 0
```

- Setup boot-loader lilo-sh
  - copy some files from debian26(/dev/hda3) to /dev/hda1

```
# mount -o rw,remount /
# cp /mnt/hda3/boot/vmlinuz-2.6.16-sh /boot
# cp /mnt/hda3/boot/boot.b-selk /boot
```

- o /etc/lilo.conf - dual boot setting between original environment and debian26

```
linear
boot=/dev/hda
disk=/dev/hda
bios=0x80
timeout=50
install=/boot/boot.b-selk
default=debian26

image=/boot/zImage
    label=linux
    root=/dev/hda1
    read-only
    append="mem=64M console=ttySC1,9600 root=/dev/hda1"

image=/boot/vmlinuz-2.6.16-sh
    label=debian26
    root=/dev/hda3
    read-only
    append="mem=64M console=ttySC1,9600 root=/dev/hda3"
```

- o Setup lilo

```
# /mnt/hda3/sbin/lilo
Added debian26 *
Added linux
```

- o reboot

```
# /home/LANDISK/scripts/powerctrl.sh reboot
```



- Login can be done by the telnet.

```
Debian GNU/Linux testing/unstable
landisk login: landisk
Password: landisk
Last login: Mon Nov 21 22:33:18 2005 from 192.168.1.2 on pts/1
Linux landisk 2.6.14-sh #1 Sat Nov 12 00:03:54 JST 2005 sh4 GNU/Linux

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
landisk@landisk:~$ su
Password: landisk
landisk:/home/landisk#
```

- How to boot from original system :  
If you switch on the device, it will boot Debian from now on.  
However, there is still a way to boot the original linux by following procedure:
  - turn off the power.
  - power button ON, and quickly (max 5 seconds) power button OFF.
  - wait a 10 second.
  - power button ON

## Additional setup

- apt-get

```
landisk:/# apt-get update

landisk:/# apt-get remove gpgv-udeb
landisk:/# apt-get install gnupg
landisk:/# wget http://ftp-master.debian.org/ziyi\_key\_2006.asc
landisk:/# apt-key add ziyi_key_2006.asc
```

```
landisk:/# apt-get update
landisk:/# apt-get upgrade
```

- gcc-4.0,g++-4.0,gcc-3.4,g++-3.4,etc

```
landisk:/# apt-get install dpkg-dev binutils gcc g++ make libncurses5-dev
landisk:/# apt-get install gcc-3.4 g++-3.4
```

- Xorg-X11

```
landisk:/# apt-get install x-window-system vncserver wdm
```

- etc/X11/wdm/Xservers (If you use not USB2VGA dongle but VNC. )

```
#:0 local /usr/bin/X11/X -nolisten TCP
:0 local /usr/bin/Xrealvnc -geometry 1024x768 -depth 16
```

- start wdm

```
landisk:/# /etc/init.d/wdm restart
Starting WINGs display manager: wdm.
```

## Additional packages and source

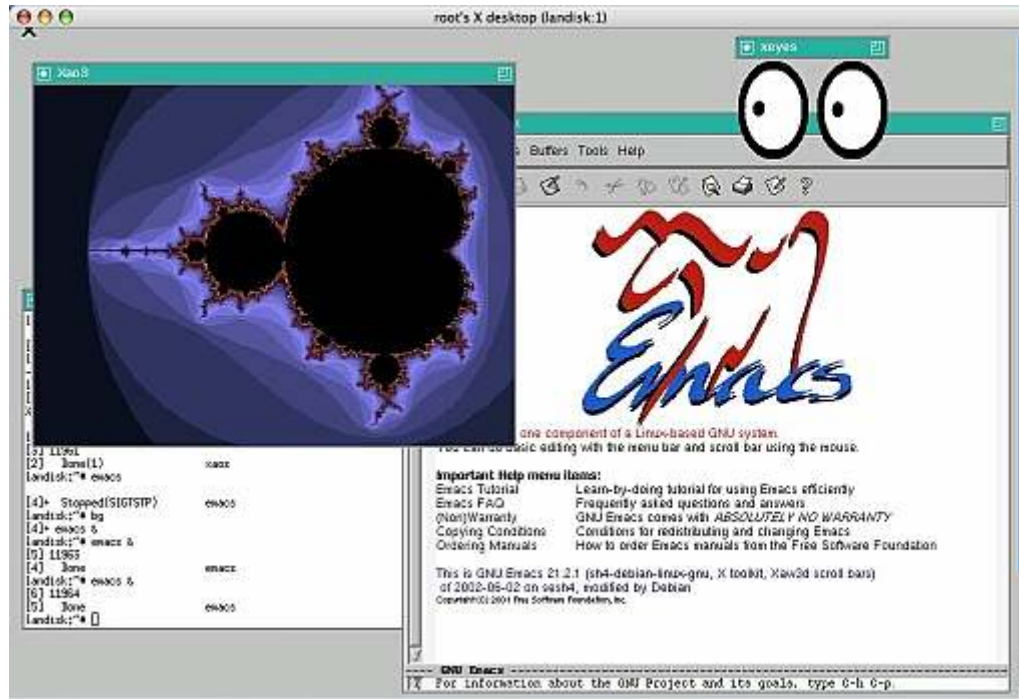
The following apt-line can be used.

```
deb http://eggplant.ddo.jp/www/download/debian26 etch main
```

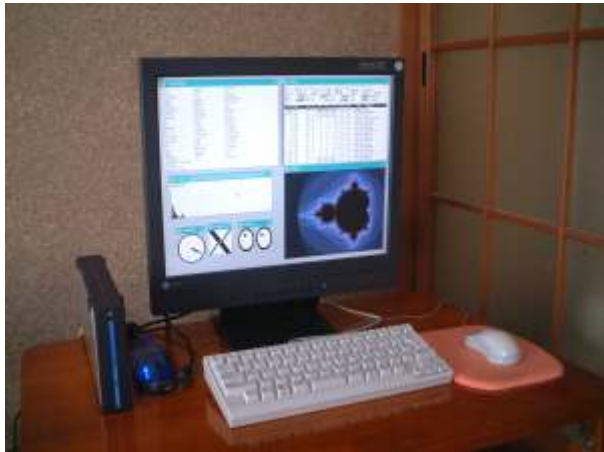
source : <http://eggplant.ddo.jp/www/download/debian26/source/>

## Screenshot

From VNC client.



## linux workstation



- Hardware  
LANDISK (HDL-160U)

USB keyboard with USB HUB

USB mouse

USB2VGA dongle ( <http://www.winischhofer.at/linuxsisusbvga.shtml> )  
display

- Software

linux-2.6.14-sh

debian26

Xorg-X11(custum Ver.)

## Appendix - How to Self-build Kernel

- setup

```
landisk:~# mkdir kernel
landisk:~# cd kernel

landisk:~/kernel# tar vxzf linux-2.6.14-sh-landisk.0.3.tgz
```

- build

```
landisk:~/kernel# cd linux-2.6.14.3
landisk:~/kernel/linux-2.6.14.3# cp arch/sh/configs/landisk_defconfig .config

landisk:~/kernel/linux-2.6.14.3# make menuconfig
landisk:~/kernel/linux-2.6.14.3# make
```

- It tests by using kexec.

```
landisk:~/kernel/linux-2.6.14.3# kexec arch/sh/boot/zImage
```

## Appendix - debian Cross-toolchain on Intel machine

<http://eggplant.ddo.jp/www/download/debian26/CROSS/>

It contains the following.

Please install it by the `dpkg -i *.deb` command.

```
binutils-sh4-linux_2.16.1-2_i386.deb
cpp-3.4-sh4-linux_3.4.4-5_i386.deb
g++-3.4-sh4-linux_3.4.4-5_i386.deb
gcc-3.4-sh4-linux_3.4.4-5_i386.deb
libstdc++6-dev-sh4-cross_3.4.4-5_all.deb
libstdc++6-sh4-cross_3.4.4-5_all.deb
cpp-4.0-sh4-linux_4.0.2-2_i386.deb
g++-4.0-sh4-linux_4.0.2-2_i386.deb
gcc-4.0-sh4-linux_4.0.2-2_i386.deb
libstdc++6-4.0-dev-sh4-cross_4.0.2-2_all.deb
libstdc++6-dev-sh4-cross_3.4.4-5_all.deb
libc6-dev-sh4-cross_2.3.5-7_all.deb
libc6-sh4-cross_2.3.5-7_all.deb
libdb1-compat-sh4-cross_2.1.3-7_all.deb
libgcc1-sh4-cross_4.0.2-2_all.deb
libncurses5-dev-sh4-cross_5.4-4_all.deb
libncurses5-sh4-cross_5.4-4_all.deb
linux-kernel-headers-sh4-cross_2.6.13+0rc3-2_all.deb
```

## Appendix - More Information

The following are my Japanese pages.

- [The automatic translation by Excite](#)
- [No translation](#)

## comment

お名前:

コメントの挿入

- Thank you so much, works great for my Plextor drive -- NPM? 2006-08-30 (水) 22:34:17
- Hi, I have a HDL-GX300, but broke my rc.local during hacking into it. Do you have any idea, who could help me? (Or who has an backup?) -- Jan? 2006-05-10 (水) 23:03:20
  - HDL-GX300 is not SH architecture but ARM. Therefore, the HDL-GX300 user will not visit this page. -- kogiidena? 2006-05-10 (水) 23:29:05

- PLEXTOR OEM Model Reviews -- kinneko? 2006-03-30 (木) 09:13:08
  - [http://www.benscustomcases.com/index.php?option=com\\_content&task=view&id=2328&Itemid=40](http://www.benscustomcases.com/index.php?option=com_content&task=view&id=2328&Itemid=40)
  - [http://www.cluboc.net/reviews/hard\\_drives/Plextor/PX-EH25L/index.htm](http://www.cluboc.net/reviews/hard_drives/Plextor/PX-EH25L/index.htm)
- Hi. I'm from Germany and the urls don't work for me. i'm told the country code was not known. -- guest1? 2006-03-29 (水) 23:37:55
  - Don't mind. What is necessary is to read only the place which can be read. -- kinneko? 2006-03-30 (木) 09:13:08

最新の5件を表示しています。 [コメントページを参照](#)

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Last-modified: Mon, 02 Oct 2006 19:52:57 JST (3h)

Webmaster: [kogiidena](#)

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