SiS 900/7016 Fast Ethernet Device Driver

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This document gives some information on installation and usage of SiS 900/7016 device driver
under Linux.

Table of Contents

Chapter 1. Introduction

This document describes the revision 1.06 and 1.07 of SiS 900/7016 Fast Ethernet device driver under Linux. The driver is developed by Silicon Integrated System Corp. and distributed freely under the GNU General Public License (GPL). The driver can be compiled as a loadable module and used under Linux kernel version 2.2.x. (rev. 1.06) With minimal changes, the driver can also be used under 2.3.x and 2.4.x kernel (rev. 1.07), please see . If you are intended to use the driver for earlier kernels, you are on your own.

The driver is tested with usual TCP/IP applications including FTP, Telnet, Netscape etc. and is used constantly by the developers.

Please send all comments/fixes/questions to Lei-Chun Chang (mailto:lcchang@sis.com.tw).

Chapter 2. Changes

Changes made in Revision 1.07

Separation of sis900.c and sis900.h in order to move most constant definition to sis900.h (many of those constants were corrected)

Clean up PCI detection, the pci-scan from Donald Becker were not used, just simple pcifind*.

MII detection is modified to support multiple mii transceiver.

Bugs in readeeprom, mdio* were removed.

Lot of sis900 irrelevant comments were removed/changed and more comments were added to reflect the real situation.

Clean up of physical/virtual address space mess in buffer descriptors.

Better transmit/receive error handling.

The driver now uses zero-copy single buffer management scheme to improve performance.

Names of variables were changed to be more consistent.

Clean up of auo-negotiation and timer code.

Automatic detection and change of PHY on the fly.

Bug in mac probing fixed.

Fix 630E equalier problem by modifying the equalizer workaround rule.

Support for ICS1893 10/100 Interated PHYceiver.

Support for media select by ifconfig.

Added kernel-doc extratable documentation.

Chapter 3. Tested Environment

This driver is developed on the following hardware

- Intel Celeron 500 with SiS 630 (rev 02) chipset

- SiS 900 (rev 01) and SiS 7016/7014 Fast Ethernet Card

and tested with these software environments

- Red Hat Linux version 6.2

- Linux kernel version 2.4.0

- Netscape version 4.6

- NcFTP 3.0.0 beta 18

- Samba version 2.0.3

Chapter 4. Files in This Package

In the package you can find these files:

sis900.c

    Driver source file in C

sis900.h

    Header file for sis900.c

sis900.sgml

    DocBook SGML source of the document

sis900.txt

    Driver document in plain text

Chapter 5. Installation

Silicon Integrated System Corp. is cooperating closely with core Linux Kernel developers. The revisions of SiS 900 driver are distributed by the usuall channels for kernel tar files and patches. Those kernel tar files for official kernel and patches for kernel pre-release can be download at official kernel ftp site (http://ftp.kernel.org/pub/linux/kernel/) and its mirrors. The 1.06 revision can be found in kernel version later than 2.3.15 and pre-2.2.14, and 1.07 revision can be found in kernel version 2.4.0. If you have no prior experience in networking under Linux, please read Ethernet HOWTO (http://www.linuxdoc.org/) and Networking HOWTO (http://www.linuxdoc.org/) available from Linux Documentation Project (LDP).

The driver is bundled in release later than 2.2.11 and 2.3.15 so this is the most easy case. Be sure you have the appropriate packages for compiling kernel source. Those packages are listed in Document/Changes in kernel source distribution. If you have to install the driver other than those bundled in kernel release, you should have your driver file `sis900.c` and `sis900.h` copied into `/usr/src/linux/drivers/net/` first. There are two alternative ways to install the driver

5.1. Building the driver as loadable module

To build the driver as a loadable kernel module you have to reconfigure the kernel to activate network support by

```
make menuconfig
```

Choose "Loadable module support --->", then select "Enable loadable module support".

Choose "Network Device Support --->", select "Ethernet (10 or 100Mbit)". Then select "EISA, VLB, PCI and on board controllers", and choose "SiS 900/7016 PCI Fast Ethernet Adapter support" to "M".

After reconfiguring the kernel, you can make the driver module by

```
make modules
```

The driver should be compiled with no errors. After compiling the driver, the driver can be installed to proper place by

```
make modules_install
```

Load the driver into kernel by

```
insmod sis900
```

When loading the driver into memory, some information message can be view by

```
dmesg
```

or

```
cat /var/log/message
```

If the driver is loaded properly you will have messages similar to this:

```
sis900.c: v1.07.06  11/07/2000
eth0: SiS 900 PCI Fast Ethernet at 0xd000, IRQ 10, 00:00:e8:83:7f:a4.
eth0: SiS 900 Internal MII PHY transceiver found at address 1.
eth0: Using SiS 900 Internal MII PHY as default
```

showing the version of the driver and the results of probing routine.

Once the driver is loaded, network can be brought up by

```
/sbin/ifconfig eth0 IPADDR broadcast BROADCAST netmask NETMASK media TYPE
```

where IPADDR, BROADCAST, NETMASK are your IP address, broadcast address and netmask respectively. TYPE is used to set medium type used by the device. Typical values are "10baseT"(twisted-pair 10Mbps Ethernet) or "100baseT" (twisted-pair 100Mbps Ethernet). For more information on how to configure network interface, please refer to Networking HOWTO (http://www.linuxdoc.org/).

The link status is also shown by kernel messages. For example, after the network interface is activated, you may have the message:

```
eth0: Media Link On 100mbps full-duplex
```

If you try to unplug the twist pair (TP) cable you will get

```
eth0: Media Link Off
```

indicating that the link is failed.

5.2. Building the driver into kernel

If you want to make the driver into kernel, choose "Y" rather than "M" on "SiS 900/7016 PCI Fast Ethernet Adapter support" when configuring the kernel. Build the kernel image in the usual way

```
make dep
```

```
make clean
```

```
make bzlilo
```

Next time the system reboot, you have the driver in memory.

Chapter 6. Known Problems and Bugs

There are some known problems and bugs. If you find any other bugs please mail to lcchang@sis.com.tw (mailto:lcchang@sis.com.tw)

AM79C901 HomePNA PHY is not thoroughly tested, there may be some bugs in the "on the fly" change of transceiver.

A bug is hidden somewhere in the receive buffer management code, the bug causes NULL pointer reference in the kernel. This fault is caught before bad things happen and reported with the message: `eth0: NULL pointer encountered in Rx ring, skipping` which can be viewed with `dmesg` or `cat /var/log/message`.

The media type change from 10Mbps to 100Mbps twisted-pair ethernet by ifconfig causes the media link down.

Chapter 7. Revision History

- November 13, 2000, Revision 1.07, seventh release, 630E problem fixed and furthur clean up.

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