

**Title**

SurePOS 4800-721/741/C41/781 P3+P4 LINUX Intel Pro/100 Ethernet Driver

**Abstract**

This download contains the Linux driver package for the SurePOS 4800-721/741/C41/781 P3+P4 Intel Pro/100 Ethernet.

**Download Description**

This package contains all the files necessary to install the Linux Ethernet driver for the Intel PRO 100 Ethernet chipset found on the SurePOS 4800-721/741/C41/781 P3+P4 models. The download is applicable to Red Hat Linux version 7.3.

**Prerequisites**

Red Hat Linux version 7.3

**Installation instructions**

The Ethernet driver package is provided as a tar file. To install the Ethernet driver, please follow the instructions contained in the package README as follows:

Linux\* Base Driver for the Intel(R) PRO/100 Family of Adapters

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November 19, 2002

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**In This Release**

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This file describes the Linux\* Base Driver for the Intel(R) PRO/100 Family of Adapters, version 2.2.x. This driver is intended for 2.4.x kernels; it is known to build properly on 2.4.x kernels through 2.4.18. Intel focused testing on Intel architectures running the 2.4.18 kernel. This driver includes support for Itanium(TM)-based systems.

The Intel PRO/100 driver is only supported as a loadable module at this time. Intel is not supplying patches against the kernel source to allow for static linking of the driver. For questions related to hardware requirements, refer to the documentation supplied with your Intel PRO/100 adapter.

### Supported Adapters

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The following Intel network adapters are compatible with the drivers in this release:

Controller	Adapter Name	Board IDs
-----	-----	-----
82558	PRO/100+ PCI Adapter	668081-xxx, 689661-xxx
82558	PRO/100+ Management Adapter	691334-xxx, 701738-xxx, 721383-xxx
82558	PRO/100+ Dual Port Server Adapter	714303-xxx, 711269-xxx, A28276-xxx
82558	PRO/100+ PCI Server Adapter	710550-xxx
82550 82559	PRO/100 S Server Adapter	752438-xxx (82550) A56831-xxx, A10563-xxx, A12171-xxx, A12321-xxx, A12320-xxx, A12170-xxx 748568-xxx (82559) 748565-xxx (82559)
82550 82559	PRO/100 S Desktop Adapter	751767-xxx (82550) 748592-xxx, A12167-xxx, A12318-xxx, A12317-xxx, A12165-xxx 748569-xxx (82559)

82559	PRO/100+ Server Adapter	729757-xxx
82559	PRO/100 S Management Adapter	748566-xxx, 748564-xxx
82550	PRO/100 S Dual Port Server Adapter	A56831-xxx
82551	PRO/100 M Desktop Adapter	A80897-xxx
	PRO/100 S Advanced Management Adapter	747842-xxx, 745171-xxx
CNR	PRO/100 VE Desktop Adapter	A10386-xxx, A10725-xxx, A23801-xxx, A19716-xxx
	PRO/100 VM Desktop Adapter	A14323-xxx, A19725-xxx, A23801-xxx, A22220-xxx, A23796-xxx

To verify that your adapter is supported, find the board ID number on the adapter. Look for a label that has a barcode and a number in the format A12345-001. Match this to the list of numbers above.

For more information on how to identify your adapter, go to the Adapter & Driver ID Guide at:

<http://support.intel.com/support/network/adapter/pro100/21397.htm>

For the latest Intel PRO/100 network driver for Linux, see:

[http://downloadfinder.intel.com/scripts-df/support\\_intel.asp](http://downloadfinder.intel.com/scripts-df/support_intel.asp)

## Building and Installation

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To build a binary RPM\* package of this driver run 'rpmbuild -tb <filename.tar.gz>'. Replace <filename.tar.gz> with the specific file name of the driver.

NOTES: For the build to work properly it is important that the currently running kernel MATCH the version and configuration of the installed kernel source. If you have just recompiled your kernel, reboot the system and choose the correct kernel to boot.

1. Move the base driver tar file to the directory of your choice. For example, use: /home/username/e100 or /usr/local/src/e100.
2. Untar/unzip the archive by entering the following, where <x.x.x> is the version number for the driver tar:

```
tar xfz e100-<x.x.x>.tar.gz
```

3. Change to the driver src directory by entering the following, where <x.x.x> is the version number for the driver tar:

```
cd e100-<x.x.x>/src/
```

4. Compile the driver module:

```
make install
```

The binary will be installed as one of the following:

```
/lib/modules/<kernel_version>/kernel/drivers/net/e100.o
```

```
/lib/modules/<kernel_version>/net/e100.o
```

The install locations listed above are the default locations. They may not be correct for certain Linux distributions. For more information, see the ldistrib.txt file included in the driver tar.

5. Install the module:

```
insmod e100 <parameter>=<value>
```

6. Assign an IP address to the interface by entering the following, where <x> is the interface number:

```
ifconfig eth<x> <IP_address>
```

7. Verify that the interface works. Enter the following, where <IP\_address> is the IP address for another machine on the same subnet as the interface that is being tested:

```
ping <IP_address>
```

## Command Line Parameters

```
=====
```

If the driver is built as a module, the following optional parameters are used by entering them on the command line with the modprobe or insmod command using this syntax:

```
modprobe e100 [<option>=<VAL1>,<VAL2>,...]
```

```
insmod e100 [<option>=<VAL1>,<VAL2>,...]
```

For example, with two Intel PRO/100 PCI adapters, entering:

```
modprobe e100 TxDescriptors=32,128
```

loads the e100 driver with 32 TX resources for the first adapter and 128 TX resources for the second adapter. This configuration favors the second adapter. The driver supports up to 16 network adapters concurrently.

The default value for each parameter is generally the recommended setting, unless otherwise noted.

NOTE: Giving any command line option the value "-1" causes the driver to use the appropriate default value for that option, as if no value was specified.

#### BundleMax

Valid Range: 1-65535

Default Value: 6

This parameter holds the maximum number of small packets (less than 128 bytes) in a bundle. Suggested values range from 2 to 10. See "CPU Cycle Saver."

#### BundleSmallFr

Valid Range: 0-1 (0=off, 1=on)

Default Value: 0

The value 1 (on) causes small packets (less than 128 bytes) to be bundled. See "CPU Cycle Saver."

#### e100\_speed\_duplex

Valid Range: 0-4 (1=10half;2=10full;3=100half;4=100full)

Default Value: 0

The default value of 0 sets the adapter to auto-negotiate. Other values set the adapter to forced speed and duplex.

Example usage: insmod e100.o e100\_speed\_duplex=4,4 (for two adapters)

#### flow\_control

Valid Range: 0-1 (0=off, 1=on)

Default Value: 0

This parameter controls the automatic generation(Tx) and response(Rx) to Ethernet PAUSE frames. flow\_control should NOT be set to 1 when the adapter is connected to an interface that does not support Ethernet PAUSE frames and when the e100\_speed\_duplex parameter is NOT set to zero.

IntDelay

Valid Range: 0-65535 (0=off)

Default Value: 1536

This parameter holds the number of time units (in adapter terminology) until the adapter generates an interrupt. The recommended value for IntDelay is 1536 (upon initialization). Suggested values range from 512 to 2048. See "CPU Cycle Saver."

IFS

Valid Range: 0-1 (0=off, 1=on)

Default Value: 1

Inter Frame Spacing (IFS) aims to reduce the number of Ethernet frame collisions by altering the time between frame transmissions. When IFS is enabled the driver tries to find an optimal IFS value. It is used only at half duplex.

RxDescriptors

Valid Range: 8-1024

Default Value: 64

This parameter defines the number of receive descriptors allocated by the driver. Increasing this value allows the driver to buffer more incoming packets before the driver is required to service an interrupt. The maximum value for Itanium-based systems is 64.

TxDescriptors

Valid Range: 19-1024

Default Value: 64

This value is the number of transmit descriptors allocated by the driver. Increasing this value allows the protocol stack to queue more transmits at the driver level. The maximum value for Itanium-based systems is 64.

ucode

Valid Range: 0-1 (0=off, 1=on)

Default Value: 0 for 82558-based adapters

1 for 82559, 82550, and 82551-based adapters

On uploads the micro code to the adapter, which enables CPU Cycle Saver. See the section "CPU Cycle Saver" below.

Example usage: insmod e100.o ucode=1

Not available on 82557-based adapters.

## XsumRX

Valid Range: 0-1 (0=off, 1=on)

Default Value: 1

On allows Rx checksum offloading for TCP/UDP packets. Requires that the hardware support this feature.

Not available on 82557 and 82558-based adapters.

## CPU Cycle Saver

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CPU Cycle Saver reduces CPU utilization by reducing the number of interrupts that the adapter generates.

When CPU Cycle Saver is turned off, the adapter generates one interrupt for every frame that is received. This means that the operating system stops what it is doing and switches to the network driver in order to process the receive.

When CPU Cycle Saver is on, the adapter does not generate an interrupt for every frame it receives. Instead, it waits until it receives several frames before generating an interrupt. This reduces the amount of time spent switching to and from the driver.

CPU Cycle Saver consists of these arguments: IntDelay, BundleMax and BundleSmallFr. When IntDelay is increased, the adapter waits longer for frames to arrive before generating the interrupt. By increasing BundleMax, the network adapter waits for the number of small frames (less than 128 bytes) specified to arrive before generating the interrupt. When BundleSmallFr is disabled, the adapter does not bundle small packets. Such small packets are often, but not always, control packets that are better served immediately; therefore, BundleSmallFr is disabled by default.

For most users, it is recommended that CPU Cycle Saver be used with the default values specified in the Command Line Parameters section. However, in some cases, performance problems may occur with CPU Cycle Saver. If such problems are observed, we recommend turning off this feature by setting ucode=0.

## Additional Configurations

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Configuring the Driver on Different Distributions

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Configuring a network driver to load properly when the system is started is distribution dependent. Typically, the configuration process involves adding an alias line to /etc/modules.conf as well as editing other system startup scripts and/or configuration files. Many popular Linux distributions ship with tools to make these changes for you. To learn the proper way to configure a network device for your system, refer to your distribution documentation. If during this process you are asked for the driver or module name, the name for the Linux Base Driver for the Intel PRO/100 Family of Adapters is e100.

As an example, if you install the e100 driver for two PRO/100 adapters (eth0 and eth1) and set the speed and duplex to 10full and 100half, add the following to modules.conf:

```
alias eth0 e100
alias eth1 e100
options e100 e100_speed_duplex=2,3
```

#### Viewing Link Messages

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In order to see link messages and other Intel driver information on your console, you must set the dmesg level up to six. This can be done by entering the following on the command line before loading the e100 driver:

```
dmesg -n 6
```

If you wish to see all messages issued by the driver, including debug messages, set the dmesg level to eight.

NOTE: This setting is not saved across reboots.

#### Enabling Wake on LAN\* (WoL)

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WoL is provided through the Ethtool\* utility. Ethtool is included with Red Hat\* 8.0. For other Linux distributions, download and install Ethtool from the following website: <http://sourceforge.net/projects/gkernel>.

For instructions on enabling WoL with Ethtool, refer to the website listed above.

WoL will be enabled on the system during the next shut down or reboot. For this driver version, in order to enable WoL, the e100 driver must be loaded when shutting down or rebooting the system.



## Known Issues

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NOTE: For distribution-specific information, refer to the ldistrib.txt file included in the driver tar.

## Driver Compilation

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When trying to compile the driver by running make install, the following error may occur:

```
"Linux kernel source not configured - missing version.h"
```

To solve this issue, create the version.h file by going to the Linux source tree and entering:

```
make include/linux/version.h.
```

## Multiple Interfaces on Same Ethernet Broadcast Network

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Due to the ARP behavior on Linux, it is not possible to have one system on two IP networks in the same Ethernet broadcast domain (non-partitioned switch) behave as expected. All Ethernet interfaces will respond to IP traffic for any IP address assigned to the system. This results in unbalanced receive traffic.

When this occurs, transmits and receives for a single conversation can be split across different network interfaces. Additionally, the server might have up to twice as much transmit capacity as receive capacity, which can result in the receive side being overrun and dropping receives.

If you have multiple interfaces in a server, install them in different switches or partition the switch into VLANs to prevent broadcast traffic from going to the wrong interface. This does not apply when using a teaming solution, like ANS.

## Support

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For general information, go to the Intel support website at:

<http://support.intel.com>

If an issue is identified with the released source code on the supported kernel with a supported adapter, email the specific information related to the issue to [linux.nics@intel.com](mailto:linux.nics@intel.com).

## License

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