



DP83820 GigMAC LINUX Server Driver Release Notes

Release 1.4

10/10/2001

***Read This Document Before Attempting To Install
Or Use This Product!***

**This document contains information about factors that must be considered before,
during, and after installation.**

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National Semiconductor DP83820 Gigabit Ethernet Adapter

1.0 Introduction

This document presents information to users about National Semiconductor's DP83820 Gigabit Ethernet adapter and the relevant LINUX software driver version 1.4 for LINUX operating system kernel version 2.2.x and 2.4.x.

2.0 Product Overview

The DP83820 is a PCI Gigabit Ethernet adapter from National Semiconductor which supports a 33/66MHz, 32/64 bit PCI 2.1/2.2 bus interface. It complies with the emerging 1000 Mbps Ethernet 802.3z specification and supports full duplex operation.

Other features include:

- Maximized PCI efficiency and performance
- Pause Frames
- Checksum Offloading
- Jumbo Frames
- Wake-on-LAN
- VLAN support

The driver for this adapter on LINUX is designed to be a NIC driver for processing Ethernet data packets.

3.0 Installation

3.1 Release Media

The release media consists of the National Semiconductor's DP83820 GigMAC LINUX driver available on CD, and National Semiconductor's website. The format of the released files are in a .RPM package and requires the following step to extract files: copy the .rpm file into a clean directory on their LINUX system and type `rpm -i <filename>`. This command will result in an extraction of the source code to a subdirectory named /nsc.

3.2 Installation Procedure

This section describes the installation of the adapter and the driver software for making the adapter functional on the LINUX platforms.

3.2.1 Hardware Installation

This section describes the installation of the GigMAC demo card into a personal computer (PC). To install the card, you need:

- the GigMAC demo card
- a PC with an available PCI slot
- screwdriver to open the PC and secure the GigMAC demo card
- a Category 5 twisted-pair RJ-45 cable
- a wrist strap
- a blank, formatted floppy disk

Installing the card consists of one optional and three required stages: Copying the Driver to a Floppy Disk (optional), Inserting the Card, Connecting the Network, and Installing the Driver. If the PC into which you are installing the GigMAC demo card is equipped with a CD-ROM, you may skip the first stage and begin with stage II.

Inserting the Card

The second stage in the installation sequence is inserting the card into the PC. For this stage you will need the GigMAC demo card and the screwdriver. Unplug the PC before opening it to avoid electrocution. Be sure to ground yourself before handling the GigMAC card to avoid ElectroStatic Discharge (ESD) damage to the card.

1. Shutdown the PC, and disconnect the power cord.
2. Open the chassis of the PC.
3. Choose an unused PCI slot and remove its metal bracket by loosening the screw on the inside. You will no longer need this metal bracket as the GigMAC demo card has its own. You will need the screw, however.
4. Remove the GigMAC demo card from the ESD-safe packaging.
Warning: Static charge from your body can permanently damage the GigMAC demo card. Do not handle the card without first electrically grounding yourself via wrist strap or by touching a large piece of metal.
5. Insert the GigMAC demo card into the empty PCI slot in the PC. Orient the card so that the RJ-45 connector points out of the computer (See Figure 2).
Warning: The card may fit backwards (with the RJ-45 pointing in) into the PCI slot. Starting the computer with the card inserted backwards may damage the card and/or the PC.

6. When you are certain the card is oriented correctly, press firmly on the card to ensure that it is completely seated in the PCI slot. Secure the GigMAC demo card using the screw from step 3.

7. Close the computer, and reconnect the power cord.

Connecting the Network

The third stage in the installation sequence is connecting the GigMAC demo card to the network. In this stage, you will need only the twisted-pair Category 5 network cable.

After you have inserted the card and closed the PC, connect one end of the twisted-pair cable to the RJ-45 connector on the GigMAC demo card, and the other end to another PC or a network hub or switch.

When connecting the card to another PC, the cable will need to be *crossover*, meaning that pins 1 and 2 must be swapped with pins 3 and 6, respectively, between the two ends of the cable. A crossover cable should not be used when connecting the GigMAC demo card to a network hub or switch.

The next time you turn on the PC, one of the two green link lights on the GigMAC demo card should become illuminated almost immediately.

This signifies that the card has established link with the device at the other end of the cable and is ready to send and receive data.

3.2.2 Software Installation and Configuration

The fourth stage in the installation sequence is installing the driver for the GigMAC demo card. The following subsections describe the procedure for installing the driver for LINUX.

LINUX Driver Installation

Follow this sequence for installation under LINUX. The format of the released files are in a .RPM package and requires the following step to extract files: copy the .rpm file into a clean directory on their LINUX system and type `rpm -i <filename>`. This command will result in an extraction of the source code to a subdirectory named /nsc.

1. To freshly make the driver

go to the /nsc directory

and execute "make"

2. To remove the binaries

execute "make clean"

3. If the machine on which the testing is done is an SMP machine, please include the flag `-D__SMP__` in the CFLAGS of the Makefile.

4. After the dpm.o (The driver module) is made, to load the driver execute the command "insmod dpm". We can unload the driver by doing "rmmod dpm".
5. After loading the driver, get the interface name(eg: eth0, eth1 etc) for the device. The last line in the messages listed will indicate the name of the interface for the driver. If the message is not coming on the console, we can see the messages in the kernel buffer by executing "dmesg" on the command line. The last line in that will indicate the interface name
6. To configure IP for the interface.

```
ifconfig <interface-name> <ip-addr>
```

eg: ifconfig eth0 10.10.10.1

To shutdown the interface.

```
ifconfig <interface-name> down
```

eg: ifconfig eth0 down

Please note that it may appear to hang on doing an "ifconfig", but it is just momentary and it will soon come out of that. The link becomes active only after about 20 seconds since the "ifconfig".

7. Now we are all set to go with the driver.
8. To make the driver load when the system boots up, the following lines needs to be put in any of the startup scripts like /etc/rc.d/rc.local or /etc/rc.d/init.d/network

```
/sbin/insmod /working/oct1/dpm.o
/sbin/ifconfig <interface-name> <ip-addr>
```
9. The tunable parameters of the driver like the Receive and Transmit buffers are put in the file nsm.h under the heading "Tunable parameters". Right now the value of RX_QUEUE_SZ is 100, on a high end system putting a value of 200 for RX_QUEUE_SZ can give better performance.

10. To try jumbo frames, the mtu size can be increased using the ifconfig utility, as follows

```
ifconfig <interface-name> mtu <mtu-size>
```

eg: ifconfig eth0 mtu 3000

The BUF_SIZE_MAX value in nsm.h (Tunable parameter) should be changed to 4096.

<mtu-size> can be increased upto 4000 bytes for sane operation.

LINK Aggregation and Configuration:

The basic link aggregation can be one with just 2 cards on the server, we can have a 4 card aggregation too. This will typically look like this for a 2 card aggregation. Here the cards 1 and 2 on the server form the aggregation and will have only one IP address (ifconfig should be done only for the aggregator, ifconfig is explained later on in the document). The clients 1 and 2 are connected to the same switch as the 2 cards on the server are connected to.

For example, the server can configured to an IP address of 10.10.10.1 and the clients to 10.10.10.2 and 10.10.10.3.

THE LOAD SEQUENCE

The LACP driver should be loaded first and the NIC driver second. The procedures for the loading of the LACP and the NIC driver are as follows.

LINK_AGGREGATION_CONFIGURATION

Go to the /link_aggr/utility directory

1. Load lacp and nic driver by running.

```
#sh aggrconf.sh -l
```

2. To Configure aggregation :

- a) Edit lacpconfig file. Note that the line begining with ';' is commented.

Format of sample lacpconfig file is given below.

```
;port:nFlags:Key:LACPActivity:LACPTimeout:AggregatorPort:AggregationId
dpm1:1:000:0:0:n:dpm0
dpm0:1:000:0:0:y:dpm0
dpm2:1:000:0:0:y:dpm2
;end of port details
```

1stfield -> <port> -> dpm0 Interface name(Run #ifconfig -a)

2ndfield -> <nFlags> -> 1 To Enable Aggregation

0 To Disable Aggregation

3rdfield -> <Key> -> 000 Currently not used - dont change

4thfield -> <LACPActivity> -> 0 Currently not used - dont change

5thfield -> <LACPTimeout> -> 0 Currently not used - dont change

6thfield -> <AggregatorPort>-> y Port configured for IP binding

n Member Port (No IP Binding)

7thfield -> <AggregationId> -> dpm0 Same as current ports interface name if AggregatorPort field is set to 'y'.

3.0 Installation

The interface name of the port to which port joins to form an aggregation group if AggregatorPort field set to 'n'.

Note : It is recommended to use sample configuration (lacpconfig) file and modify the fields as explained above.

Note : Multiple Aggregation is supported.

b) After Editing Configuration file Run

```
#sh aggrconf.sh -c
```

c) Configure IP address for the interfaces chosen as AggregatorPort.

```
#ifconfig <interface_name> <ip_address>
```

3. To Change the existing Aggregation configuration modify the fields of lacpconfig file as explained below and run

```
#sh aggrconf.sh -c
```

a) To disable Aggregation set 2nd field to '0'

b) Only member port can be moved from current aggregation group to other aggregation group.

Ex: From the above sample dpm1 is under the group dpm0 this could be moved to another group dpm2 by modifying <7thfield> to dpm2.

```
dpm1:1:000:0:0:n:dpm2
```

Note: AggregatorPort cannot be moved from one Aggregation to another

4. To have the existing configuration after reboot, add the following statements to /etc/rc.d/rc.local file

```
sh /link_aggr/utility/aggrconf.sh -l
```

```
sh /link_aggr/utility/aggrconf.sh -c
```

```
ifconfig <interface_name_of_AggregatorPort> <ip_address>
```

5. To Unload drivers both lacp and dpm, Run

```
#sh aggrconf.sh -u
```

Note : Configured Aggregator Port cannot be moved to another aggregation, unless Aggregation is removed by setting the nFlags field of the aggregator to '0' in the lacpconfig file and run the utility.

FOR THE LACP DRIVER

1. To freshly make the driver

go to the /link_aggr/lacp directory

and execute "make"

2. To remove the binaries

execute "make clean"

3. If the machine on which the testing is done is an SMP machine, please include the flag -D__SMP__ in the CFLAGS of the Makefile.

3.2.3 Installation Troubleshooting

3.2.4 Disk Space Requirements

3.2.5 Errata

Currently an issue exists supporting jumbo frames larger than 4k. 4k Maximum frame size is recommended for maximum performance.

4.0 Product Documentation

This release notes document, *National Semiconductor Corp DP83820 Gigabit Ethernet Adapter Driver Release Notes*, provides detailed information about installing the National Semiconductor Corp DP83820 Gigabit Ethernet Adapter and Driver software.

5.0 Problem Reporting

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