Enetdiag.exe Utility for DOS User's Guide

National Semiconductor
User Guide, **Confidential**
August 2000
Revision 1.0

1.0 General Description

The Enetdiag.exe is a DOS based utility that can be used to test and verify operation of the National Semiconductor® DP83815 MacPHYTER™ Ethernet controller which is used on several National Geode™ platforms, as well as PCI add-on Ethernet cards. This utility can be run from a floppy disk or a fixed disk, including an M-Systems' DiskOnChip (DOC).

1.1 REQUIREMENTS

The following system requirements are necessary to run the Enetdiag.exe utility:

- DP83815 10/100 Mb/s Integrated PCI Ethernet Media Access Controller
- Suitable Ethernet cable:
  — If an Ethernet hub is used, a standard cable is needed. If two machines are connected without a hub, a 'crossover' or null cable is required. Cables are available at computer supply stores.
- Hardware loopback fixture
- DOS 6.2
- 8 MB of RAM
- Floppy disk or other program transfer medium

The Master and Slave menu options require a second (remote) Ethernet-connected system to perform correctly. For additional information, see Section 2.1 "Menu Choices (In Interactive Mode)" on page 2.

2.0 Using Enetdiag.exe

Perform the following steps to run the Enetdiag.exe utility:

Type 'enetdiag' at the DOS prompt to invoke the following menu or type a batch file command (see details below the menu) at the DOS prompt to override the menu.

```
WELCOME to DIAG.EXE version: 4.2

USAGE: DIAG [B] <test> [option]

DIAG B <test> [option] - for use of DIAG in batch mode

E Initialize EEPROM with Default Values.

C[M/V/D] [macAddress] Change Mac/subVendor/subDevice ID

M [# of packets] Master mode.

S Slave mode

L[M/P/X] Mac/Phy/eXternal loopback test

T [# of packets] Transmit test packet(s)

R Receive test packet(s)

D[N/P/E] Display NIC/PCI/EEPROM Registers.

P[M/L/S [macAddress]] Pwr Mgmt WakeOn Mgk-Pkt/Link/Send MgkPkt

Q QUIT utility

Enter selection
```

Examples of batch file commands:

C:/ **enetdiag b c 10 10 22 01 02 03**
The '**c'** in this batch file command allows the user to re-program the Mac (Media Access Controller) address to any value - in this example it was changed to 10 10 22 01 02 03.

C:/ **enetdiag b c 10 10 22 01 02 03 > outfile.txt**
This batch file command changes the Mac (Media Access Controller) address as well as writes the results to the outfile.txt file.

National Semiconductor is a registered trademark of National Semiconductor Corporation.
MacPHYTER is a trademark of National Semiconductor Corporation.
For a complete listing of National Semiconductor trademarks, please visit www.national.com/trademarks.

2.1 MENU CHOICES (IN INTERACTIVE MODE)

B: Entry made on the command line to signify Batch mode (not used in Interactive mode).

E: Initializes the EEPROM with the following default values:

```
* eeprom 0     d008      #subsystem vendor
* eeprom 1     0400      #subsys id
* eeprom 2     2cd0      # min gnt, max lat
* eeprom 3     cf82      # config stuff
* eeprom 4     0000      # secure on pw stuff
* eeprom 5     oooo      # secure on pw stuff
* eeprom 6     0000      # LSB is part of Ethernet ID
* eeprom 7     2001      # Ethernet ID
* eeprom 8     d1a1      # Ethernet ID
* eeprom 9     $Loc9     # Ethernet ID
* eeprom a     a098
* eeprom b     $value    # checksum
```

CM: Change Mac (Media Access Controller) Address
The command CM allows the user to program a Mac (Media Access Controller) address for the device to any 6-byte value.

Note: This address, in a 'real' network interface application would be factory programmed with a unique value within a range of addresses that would have been assigned to the manufacturer by the IEEE, Registration Authority Committee (RAC).

Caution: Should this device be put on a LAN or WAN, there is the possibility, although remote, of address conflict.

CV: Change Subsystem Vendor ID
The CV command enables the user to specifically set the subsystem vendor ID stored in the EEPROM. This is useful for vendors designing in the DP83815 into vendor-specific networking devices.

CD: Change Subsystem Device ID
The CD command enables the user to specifically set the subsystem device ID stored in the EEPROM. This is useful for vendors designing in the DP83815 into vendor-specific networking devices

M: Master Mode
In Master mode, the device sends a user a chosen number of PING packets as well as receives (and prints to screen) the return message(s). The outputs may be redirected to a file using the DOS '>' symbol and the resulting file analyzed for errors, etc.

Note: A second device, running in Slave mode is required for this test, and is useful for testing two devices connected together.

S: Slave Mode
In Slave mode, the device responds to data received from the Master mode and prints to screen. The outputs may be redirected to a file using the DOS '>' symbol and the resulting file analyzed for errors, etc.

Note: A second device, running in Master mode is required for this test, and is useful for testing two devices connected together.

LM: Mac (Media Access Controller) Loopback Test
The Mac Loopback test loops the signals from a transmit block back into a receive block.

LP: PHY Loopback Test
The PHY (physical) Loopback test internally connects the outputs of the transmitter and receiver sections while disconnecting these sections from the output pins. This allows testing of all internal data paths up to, but not including, the transmitter and receiver output sections (pins).

LX: Cable Loopback Test
The Cable Loopback is the most complete test. It tests all blocks including the connector by connecting the output and input paths of the Mac just before the physical layer (transmitter-receiver). A loopback fixture, as shown in Figure 2-1, is used to conduct this test. The loopback fixture must be plugged into the Ethernet 10/100 BaseT connector prior to running this test.

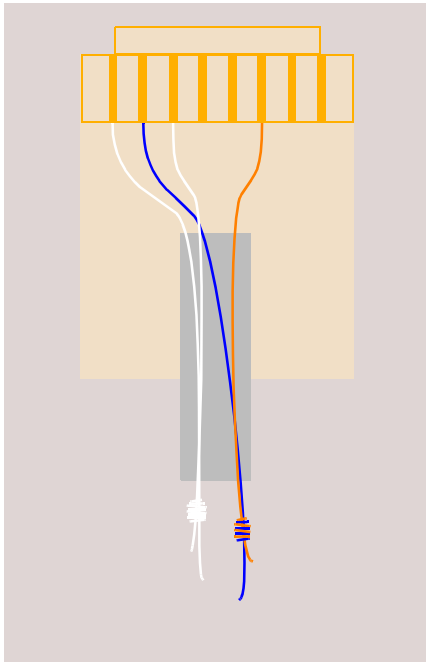

Figure 2-1. Hardware Loopback Fixture

2.2 LOOPBACK TEST MODE

The DP83815 includes a PHY Loopback test mode for easy board diagnostics. The Loopback mode is selected through bit 14 (Loopback) of the Basic Mode Control Register (BMCR). Writing 1 to this bit enables transmit data to be routed to the receive path early in the physical layer cell.

Loopback status may be checked in bit 3 of the PHY Status Register (C0h). While in Loopback mode, the data will not be transmitted onto the media. This is true for 10 Mb/s as well as 100 Mb/s data.

In 100BASE-TX Loopback mode, the data is routed through the PCS and PMA layers into the PMD sub-layer before it is looped back. Therefore, in addition to serving as a board diagnostic, this mode serves as quick functional verification of the device.

A Mac loopback can be performed by setting bit 29 (MAC Loopback) in the Tx Configuration Register.

T: Transmit
The Transmit mode transmits packets until stopped by a control C, entered by the user. Since there is no data received in the Transmit mode, there is no data printed on the screen or redirected to a disk file.

R: Receive
The Receive mode receives PING packets and displays them to the screen. The results of this command may be redirected to a disk file for later analysis.

DN: Display NIC Registers
Allows the user to view the internal NIC registers.

DP: Display PCI Configuration Space
Allows the user to view the PCI bus interface registers.

DE: Display EEPROM Contents
If an external EEPROM is installed, the DE command allows the user to view the internal registers.

PM: Power Management Test Mode : : MAGIC PACKET
This Power Management mode prepares the MacPHYTER chip for a power Suspend mode until a 'magic packet' is seen.

PL: Power Management Test Mode : : LINK CHANGE
This Power Management mode sets the DP83815 into a power-down mode while waiting for activity on the Link. Refer to the DP83815 data sheet for full details on the many power management features.

PS: Power Management Test Mode : : Send Magic Packet
This function allows the user to transmit a magic packet to a system currently in Suspend mode to test wake up capability. The user must enter the physical Mac address of the suspended system in order for the correct packet to be sent.

Q: Quit Utility

Returns to the DOS prompt.

Appendix A DP83815 MacPHYTER Device Reset Code

NIC Initialization Values

The DP83815 is initialized to these values for all utilities other than Quit, and the register reads DN, DE, and DP. These values have been extracted from source code. All port values are relative to base address. Refer to the DP83815 data sheet for more details.

NIC Reset Details

The NIC is reset to the following values before being initialized:

```
{
INT_ENABLE = 0
INT_MASK = 0 )
RX_FILTER_CTRL = 0
MIB_CTRL = 0x00000004            // clear all counters
Base = 000000130
CFG = 0x8                        //PESEL bit.
}

PCITEST_CNTRL, 0x04              // Download eeprom defaults

PHY_BMCR, BMCR_RESET );          // Reset the PHY

TX_CONFIG, 0x10C00230 );         // Config the transmit register.

RX_CONFIG, 0x00500008 );

XXXX

RX_FILTER_CTRL, RX_FILTER_CTRL_RFEN | RX_FILTER_CTRL_AAB  |\
RX_FILTER_CTRL_AAM  |\X_FILTER_CTRL_APM );
/* Phy register initialization:*/
PHY_PAGESEL  ),  0x0001
PHY_PMDCSR   ),  0x189c
PHY_TSTDAT   ),  0x0000
PHY_CCDSPCFG ),  0x5040
PHY_CCSDCFG  ),  0x008c
PHY_PAGESEL  ),  0x0000

// Initialize the memory blocks:
…
CODE HERE TO INIT SCRATCH PAD MEMORY AND BUFFERS
…
// Clear the MIB counters:
 MIB_CTRL, MIB_CTRL_ACLR );
// SET THE INTERRUPT MASK REGISTER:
 INT_MASK,          INT_DPERR  |
                    INT_SSERR  |
                    INT_RMABT  |
                    INT_RTABT  |
                    INT_RXSOVR |
                    INT_TXERR  |
                    INT_TXOK   |
                    INT_RXERR  |
                    INT_RXOK   |
                    INT_RXORN

// Write current receive descriptor to register RX DP:
 RX_DP, DosLogicalToPhysical( &RxDescriptorPool[ 0 ] ) );

// Enable Receive:
Zero offset, 0x00000004
```

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

National Semiconductor Corporation
Americas
Tel: 1-800-272-9959
Fax: 1-800-737-7018
Email: support@nsc.com

National Semiconductor Europe
Fax: +49 (0) 180-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 69 9508 6208
English Tel: +44 (0) 870 24 0 2171
Français Tel: +33 (0) 1 41 91 87 90

National Semiconductor Asia Pacific Customer Response Group
Tel: 65-2544466
Fax: 65-2504466
Email: ap.support@nsc.com

National Semiconductor Japan Ltd.
Tel: 81-3-5639-7560
Fax: 81-3-5639-7507
Email: nsj.crc@jksmtp.nsc.com

www.national.com

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.