Broadcom 440X Fast Ethernet Controller Engineering Diagnostics User's Guide

This chapter provides the following information:

Introduction

This document provides information on the b44diag.exe diagnostic program for the Broadcom 440X Fast Ethernet Controller. When the b44diag.exe program is started, a series of tests are executed on the 440X Fast Ethernet controller. If a test fails, the b44diag program displays an error and exits to DOS.

The b44diag.exe program can be run in two different modes:

- Manufacturing mode
- Engineering mode

When the b44diag program is run in engineering mode, it prompts the user for commands. In manufacturing mode, the following options are available:

-l <file>	Log data to file
-c <num>	Specify the card to be tested
-I <num>	Iteration number
-t <id>	Disable tests
-T <id>	Enable tests
-com <value>	Comm port enable (internal use only)
-r <num>	Input radix
-n	Run in manufacture loop
-e	Run program in engineering mode
-m	Program the MAC address

-f<filename>	Program eeprom content from bin before testing
-mac	Program the MAC address from the command line
-fmac <filename>	Program the MAC address from the text file through the command line
-b <num>	Enables/disables the Boot ROM 0 = Disable 1 = 16 KB 2 = 32 KB 3 = 64 KB 4 = 128 KB
-lbm	Option to specify the number of packets in the MAC Loopback test
-lbp	Option to specify the number of packets in the PHY Loopback test
-lbh	Option to specify the number of packets in the 100BT External Loopback test
-lbt	Option to specify the number of packets in the 10BT External Loopback test

Example:

>b44diag -e XXXX -c 0 -f eeprom.bin -fmac macaddr.txt -b 3 -t abc

-e: enter engineering mode.
-c: card select.
-f: program the SROM with eeprom.bin. Basic information is loaded to the SROM. The MAC address remains the same. Error if the file name is missing.
-fmac: program the MAC address from the MAC address file. Only the MAC address is updated. Error if the file name is missing.
-b: enable 64 KB boot ROM. 0 = disable, 1 = 16 KB, 2 = 32 KB, 3 = 64 KB, 4 = 128 KB. The Boot ROM status remains unchanged if the -b option is not entered.
-t: disable Test Group A, B, and C.

MAC Address Programming Option

Instead of entering the -fmac option, the MAC address in the SROM can also be programmed by entering either of the -m and Mac options. By entering the -m option, the user is prompted to enter the MAC address. To use the Mac option, the user needs to provide the MAC address after entering the Mac option.

Example: b44diag -e XXXXXX -c 0 -f eeprom.bin Mac 001018112240 -b 3

> b44diag -e XXXXX -c 0 -fmac macaddr.txt

> b44diag -e XXXXX -m

XXXXX = password.

If the password is valid, the user is prompted to enter a 12-byte MAC address. The NIC card is programmed with the new MAC address before running any test.

> b44diag -e XXXXX -f eeprom.bin

The NIC card is programmed with the new content from eeprom.bin before the test.

> b44diag -l test.log -c 1 -I 2 -t A3

> b44udiag -l test.log -c 1 -I 2 -t A3 -lbm 3000 -lbp 3000 -lbh 3000 -lbt 3000

Prerequisites

OS: DOS 6.22

Software: b44diag.exe

Diagnostic Tests

There are three groups of tests, and each group has some sub-tests.

Group A

A1. Indirect Control Register Test

A2. Direct Control Register Test

A3. Interrupt Test

A4. Built-in Self Test

Group B

B1. LEDs Test

B2. EEPROM Test

B3. MII Test

B4. Link Status Test

Group C

C1. MAC Loopback Test

Test Descriptions

A1. Indirect Control Register Test

Command: regtest -i

Function: Each register that is specified in the configuration contents read only bit and read/write bit defines. The test writing 0 and 1 by using the indirect addressing method into the test bits ensures that the read only bits are not changed, and read/write bits are changed accordingly.

Default: Enabled

A2. Direct Control Register Test

Command: regtest

Function: Each register that is specified in the configuration contents read only bit and read/write bit defines. The test writing 0 and 1 into the test bits ensures that the read only bits are not changed, and read/write bits are changed accordingly.

Default: Enabled

A3. Interrupt Test

Command: intrtest

Function: Verifies the interrupt functionality by enabling interrupt, and waits for an interrupt to occur. It waits for 500 ms and reports an error if it cannot generate interrupts.

Default: Enabled

A4. Built-In Self Test

Command: bist

Function: Runs the Built-in Self test.

Default: Enabled

B1. LED Test

Command: ledtest

Function: Tests forcing of the link state for each link speed/duplex.

Default: Enabled

B2. EEPROM Test

Command: setest

Function: Reads the Serial Prom and verifies the integrity by checking CRC.

Default: Enabled

B3. MII Test

Command: miitest

Function: Each register that is specified in the configuration contents read only bit and read/write bit defines. The test writing 0 and 1 into the test bits ensures that the read only bits value are not changed, and read/write bits are changed accordingly.

Default: Enabled

B4. Link Status Test

Command: linkstatus

Function: Reports the current link status.

Default: Enabled

C1. MAC Loopback Test

Command: lbtest -m

Function: Transmits a 2000 or specified by -lbm option of 1514-byte packets with incrementing data pattern, and checks tx and rx flags and data integrity.

Default: Enabled

C2. PHY Loopback Test

Command: lbtest -p

Function: This test is same as the MAC Loopback Test, except that the data is routed back via physical layer device.

Default: Enabled

C3. External Loopback Test 100BT

Command: lbtest -e

Function: This test is same as the MAC Loopback Test, except that the data is routed back via a loopback device

Default: Disabled

C4. External Loopback Test 10BT

Command: lbtest -a

Function: This test is same as the MAC Loopback Test, except that the data is routed back via loopback device.

Default: Disabled

By default, all tests except C3 and C4 are covered in manufacturing mode unless disabled by the user.

The Engineering mode can be selected by option -b44eng.

Example:

```
> b44diag -b44eng
```

Test and Functions Description

When the program is in engineering mode, it prompts the commands to be entered. The following section lists all the commands.

lbtest

cmd: lbtest

Description: Performs various loopback tests.

Syntax: lbtest [n | c | t] [m | p | a | e]

'n' = iteration
'c' = maximum packet count
't' = packet type: 0 = all 0s, 1 = all 1s, 2 = 5555, 3 = AAAA, 4 = 0F0F, 5 = F0F0, 6 = FF00, 7 = 00FF, 8 = FFFF0000, 9 = 0000FFFF, 10 = Inc, 11 = Random
'm' = MAC Loopback
'p' = Phy Loopback
'e' = 100BT External Loopback
'a' = 10BT External Loopback

Default maximum packet count = 2000
Default iteration = 1
Default pattern = inc.

Example:

```
0:>lbtest -e -n=10 -c=2500 -t=3 (10 times external loopback test with
2500 packets, and pattern is AAAA)
```

phyctrl

cmd: phyctrl

Description: Configures speeds/duplex of PHY.

Syntax: phyctrl [s] [h] [r] [f]

's' = 0:10 Mbps, 1:100 Mbps
'h' = half-duplex
'r' = reset phy
'c' = force
'f' = write phy initialization scripts

Example:

```
0:> phyctrl -s=0 -h (10 Mbps half-duplex) initialization scripts
0:> phyctrl -s=1 -h -c (force 100BT half-duplex)
```

loadd

cmd: loadd

Description: Loads the default chip setting before the blast.

Syntax: loadd

blast

cmd: blast

Description: The Blast Packets in Poll mode.

Syntax: blast [t | r | h] [n] [l] [i] [e]

't' = TX
'r' = RX
'h' = host loop back (with minimum 17.6 usec ipg)
'n' = number of packets to transmit
'l' = transmit packets size (minimum = 60)
'i' = increment transmit packets length
'e' = Upper limit of TX buffer in incremental packet size
'p' = packet type: 0 = all 0s, 1 = all 1s, 2 = 5555, 3 = AAAA, 4 = 0F0F, 5 = F0F0, 6 = FF00, 7 =

00FF, 8 = FFFF0000, 9 = 0000FFFF, 10 = Inc, 11 = Random
'd' = Interpacket GAP in microseconds

Example:

```
0:> blast -t -r -p=11 -l=1514 (RX and TX packet with 1514 bytes of
random data)
0:> blast -t -n=10000 -l=1514 (TX 10000 packets with size of 1514 bytes
of default pattern)
0:> blast -t -n=10000 -l=1514 -p=3 (TX 10000 packets with size of 1514
bytes of AAAA pattern)
0:> blast -t -n=10000 -i -e=1514 (TX 10000 packets with inc size of
default pattern)
0:> blast –t (TX packets with size of 64 bytes of default pattern until
stop)
0:> blast –r (RX packets until stop)
0:> blast -h (with minimum 17.6 usec ipg)
```

* Blast does not reset the chip anymore. The user must use the Reset command to reset the chip, and the loadd command to set up the chip to the default state.

Example:

```
0:> reset (reset chip)
0:> loadd (set chip to default state)
0:> do abc.do (run script or write register if needed)
0:> blast -t -r -p=11 -l=1514 (RX and TX packet with 1514 bytes of
random data)
```

To stop, press the Esc key.

nicstats

cmd: nicstats

Description: Displays the NIC statistics.

Syntax: nicstats [c]

c = reset counters

Example:

```
0:> nicstats (display NIC statistics)
0:> nicstats –c (reset counters)
```

setest

cmd: setest

Description: Serial EEPROM read/write test. The serial EEPROM tests dump the contents of the serial EEPROM to the screen, and verifies the data with a CRC check.

Syntax: setest [iteration]

Example:

1. Display Help.

```
0:> setest ?

      Usage : setest [iteration]

      Description:

      The default iteration is 1. 0 means run forever
```

mread

cmd: mread

Description: Read PHY registers via MII.

Syntax: mread <begin_addr>[| <len>]

Address range: 0x00 – 0x1F

Example:

1. Read MII register 0

```
0:> mread 0
00: 1100
```

2. Read MII registers 0 to 10

```
0:> mread 0-10

00: 1100 7949 0020 6051 01e1 0000 0004 2001

08: 0000 0300 0000 0000 0000 0000 0000 3000

10: 0002
```

3. Read 5 MII registers start from register

```
0:> mread 0 5
00: 1100 7949 0020 6051 01e1
```

mwrite

cmd: mwrite

Description: Write PHY registers via MII.

Syntax: mwrtie <addr > <value>

Address range: 0x00 – 0x1F

Example:

1. Write 0x15 to MII register 2

```
0:> mwrite 2 15
```

miitest

cmd: miitest [iteration]

Description: PHY registers read write test.

Syntax: miitest

read

cmd: read

Description: Generic Memory read.

Syntax: read [!|S|X|#|m|$|l|s|x]<begin_addr> [- end_addr | num_bytes]

! = Configuration space (address range: 0x00 – 0xFF) (32)

S = Configuration space (address range: 0x00 – 0xFF) (16)

X = Configuration space (address range: 0x00 – 0xFF) (16)

$ = Serial EEPROM

m = MII Registers

l = Direct access (dword)

s = Direct access (word)

x = Direct access (byte)

write

cmd: write

Description: Generic Memory write.

Syntax: write [!|S|X|#|$|l|s|x]<begin_addr> [- end_addr] <value>

! = Configuration space (address range: 0x00 – 0xFF) (32)

S = Configuration space (address range: 0x00 – 0xFF) (16)

X = Configuration space (address range: 0x00 – 0xFF) (16)

$ = Serial EEPROM

l = Direct access (dword)

s = Direct access (word)

x = Direct access (byte)

intrtest

cmd: intrtest

Description: Interrupt test.

Syntax: intrtest

regtest

cmd: regtest

Description: MAC registers read write test.

Syntax: regtest [<iteration>]

pciscan

cmd: pciscan

Description: Scan for all PCI devices.

Syntax: pciscan

Example:

```
0:> pciscan

Scanning PCI devices ...
```

Bus	Dev	Func	Vendor ID	Device ID	Class	Base/IO Address	IRQ
0	0	0	8086	7190	06:00:00	00000000:F8000008	0
0	1	0	8086	7191	06:04:00	00000000:00000000	0
0	7	0	8086	7110	06:01:00	00000000:00000000	0
0	7	1	8086	7111	01:01:80	00000000:00000000	0
0	7	2	8086	7112	0C:03:00	00000000:00000000	9
0	7	3	8086	7113	06:80:00	00000000:00000000	0
0	14	0	12AE	0003	02:00:00	00000000:F4000004	10
1	0	0	1002	4742	03:00:00	00009001:F5000000	11

dos

cmd: DOS

Description: Enter to DOS shell.

Syntax: DOS

Example:

```
0:> DOS
```

pciinit

cmd: pciinit

Description: Initialize PCI configuration registers

Syntax: pciinit

Example:

```
0:misc> pciinit
Initializing PCI Configuration Space
Bus Number       : 0
Device/Function   : 14/0
Base Address     : 0xf4000004
```

q

cmd: q

Description: Exits.

Syntax: q

exit

cmd: exit

Description: Exits.

Syntax: exit

help

cmd: help

Description: Displays help.

Syntax: help

log

cmd: log

Description: Logs data to file.

Syntax: log <filename>

Example:

```
0:> log test.log

started logfile 'test.log'
```

nolog

cmd: nolog

Description: Closes the current log file.

Syntax: nolog

Example:

```
0:> nolog

logfile closed at Mon Mar 4 15:25:11 2002
```

reset

cmd: reset

Description: Resets the chip.

Syntax: reset

Example:

```
0:> reset
```

teste

cmd: teste

Description: Enables tests in the test configuration.

Syntax: teste <group><tests index>

Example:

```
0:> teste A23
```

Enabled Tests:

- A2 Control Register Test
- A3 Interrupt Test

testd

cmd: testd

Description: Disables the tests in the test configuration.

Syntax: testd <group><tests index>

Example:

```
0:> testd A23
```

Disabled Tests:

- A2 Control Register Test
- A3 Interrupt Test

nictest

cmd: nictest

Description: Runs tests in configuration.

Syntax: nictest

cls

cmd: cls

Description: Clears screen.

Syntax: cls

loop

cmd: loop

Description: Runs cmd n times.

Syntax: loop [iteration] <cmd> [<parameter> ...]

Example:

```
0:> loop 3 miitest (run miitest 3 times)
```

mrloop

cmd: mrloop

Description: A special test routine for MII read that loops on MII register read until it is aborted, or if the value is 0.

Syntax: mrloop <addr>

Example:

```
0:> mrloop 02 (Loop on MII read at reg 02)
```

inp

cmd: inp

Description: Reads port input.

Syntax: inp <addr>

outp

cmd: outp

Description: Writes to port.

Syntax: outp <addr> <data>

linkstatus

cmd: linkstatus

Description: Reports link status.

Syntax: linkstatus

sleep

cmd: sleep

Description: The suspense process for the Execute command from a file.

Syntax: sleep <ms>

version

cmd: version

Description: Displays the current software version.

Syntax: version

dev

cmd: dev

Description: Displays and selects a device.

Syntax: dev <device index>

sromutil

cmd: sromutil

Description: Provides SROM access.

Syntax: sromutil [b<n>] [m <macaddr> <devID> <vedID> <subID>] [c|C|d] [w<location> <value>]

'b'= Enable bootrom, size encoding: 0=Disable, 1=16 KB, 2=32 KB, 3=64 KB, 4=128 KB
'm'= program addr: macaddr subvenID subdevID

'C'= check_crc
'c'= fix crc
'd'= just dump
'w'= program word; location in hex; word in hex;
'f'= out put image to eeprom.bin and eeprom.txt or filename.bin and filename.txt.

Example:

```
sromutil -b 1 -m xxxxxxxxxxxx xxxx xxxx (Enable 16 KB bootrom; Program
addr)
sromutil -m xxxxxxxxxxxx xxxx xxxx (Boot rom status remain unchanged;
Program addr)
sromutil -b 0 (Disable bootrom);
sromutil -b 1 (Enable 16 KB bootrom);
sromutil -C (Check crc)
sromutil -c (Fix crc)
sromutil -d (Dumping data to screen)
sromutil -d -f<filename>  (Dumping data to screen, eeprom.bin and
eeprom.txt or filename.bin and filename.txt)
sromutil -w 35    1235 (Program word)
```

setbit

cmd: setbit

Description: Sets bit of Generic Memory.

Syntax: setbit [!|S|X|#|m|$|l|s|x]<addr> <bit#> [<bit#>] ....

! = Configuration space (address range: 0x00 – 0xFF) (32)
S = Configuration space (address range: 0x00 – 0xFF) (16)
X = Configuration space (address range: 0x00 – 0xFF) (08)
$ = Serial EEPROM
m = MII Registers
l = Direct access (dword)
s = Direct access (word)
x = Direct access (byte)

clearbit

cmd: clearbit

Description: Clears bit of Generic Memory.

Syntax: clearbit [!|S|X|#|m|$|l|s|x]<addr> <bit#> [<bit#>] ....

! = Configuration space (address range: 0x00 – 0xFF) (32)
S = Configuration space (address range: 0x00 – 0xFF) (16)
X = Configuration space (address range: 0x00 – 0xFF) (08)
$ = Serial EEPROM
m = MII Registers
l = Direct access (dword)
s = Direct access (word)
x = Direct access (byte)

seprg

cmd: seprg

Description: Reads data from the file and program into seeprom. The file name must be specified in the parameter. The MAC address remains unchanged.

Syntax: seprg <f><file name> [|o] [|l] (The file name must be specified in the parameter)

'f' = filename
'o' = offset of serial eeprom
'l' = length in bytes (Default = size of input file)

Example:

```
seprg -f=c:\eeprom.bin
```

do

cmd: do

Description: Executes a command from a script file.

Syntax: do <filename.do>

Script file example:

```
reset
linkstatus
mwrite 0 8000
sleep 1000
mread 02
```

Back to Top

Restrictions and Disclaimers

The information contained in this document, including all instructions, cautions, and regulatory approvals and certifications, is provided by the supplier and has not been independently verified or tested by Dell. Dell cannot be responsible for damage caused as a result of either following or failing to follow these instructions. All statements or claims regarding the properties, capabilities, speeds or qualifications of the part referenced in this document are made by the supplier and not by Dell. Dell specifically disclaims knowledge of the accuracy, completeness or substantiation for any such statements. All questions or comments relating to such statements or claims should be directed to the supplier.

Release: 440X-UM301-D1, November 26, 2002