



VT6120/VT6121/VT6122

Gigabit Ethernet Controller Mass Production Guide

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VIA Networking Technologies, INC.

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1.10	6/27/03	First draft for internal review.	Ryan
1.20	6/30/03	Use new document template & add 2-card test in MPE	Ryan
1.30	7/15/03	Use network test to replace 2-card test in MPE	Ryan
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1. EEPROM Utility

The eeprom utility provides read/write functions to EEPROM. You can use this program to modify your MAC address and Sub-System and Sub-Vendor ID. We provide an eeprom.cfg for the default value of EEPROM content. Every time after eeprom tool loads eeprom.cfg to program EEPROM, the MAC address value in eeprom.cfg will be added by 1 automatically. It can save some time for the operator because he/she does not have to modify the eeprom.cfg every time when he/she needs to program the EEPROM contents of a lot of NIC adapters. The default value in eeprom.cfg for VT6120 NIC adapter is :

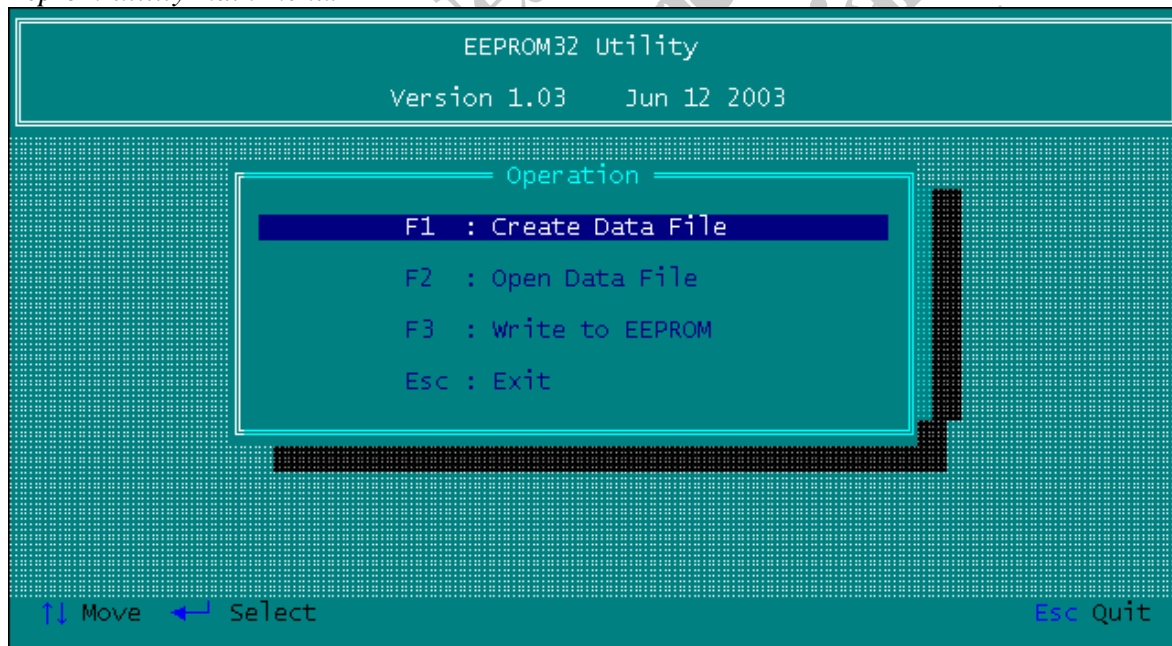
Ethernet ID : 000000000001

Sub-System : 0x0110

Sub-Vendor : 0x1106

The OEM customer must change the Ethernet ID, Sub-System ID and Sub-Vendor ID in eeprom.cfg to its own values. The OEM customer can run eeprom32.exe and use F2 key to open eeprom.cfg to change some values in eeprom.cfg and use F10 key to save the values to eeprom.cfg.

Eeprom utility main menu:



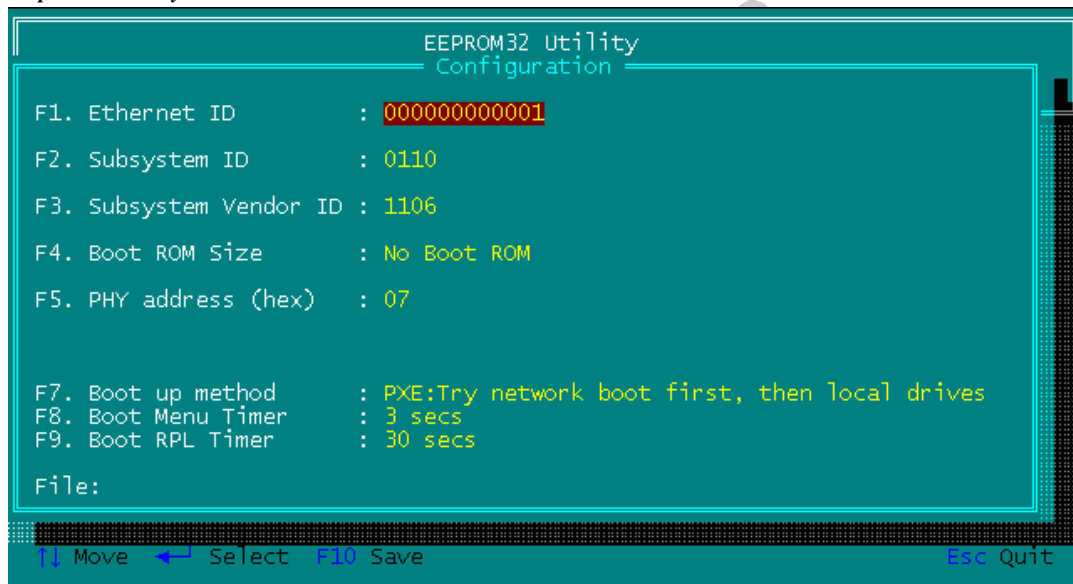
1-1. The EEPROM Utility GUI Menu

The eeprom utility consists of four functions:

1. F1: Create Data File

You should use this function to create a new EEPROM data file. The default value of "Ethernet ID", "Subsystem ID", "Subsystem Vendor ID" and "PHY address" are only default values. Modify them to the valid values if necessary and save them to a file.

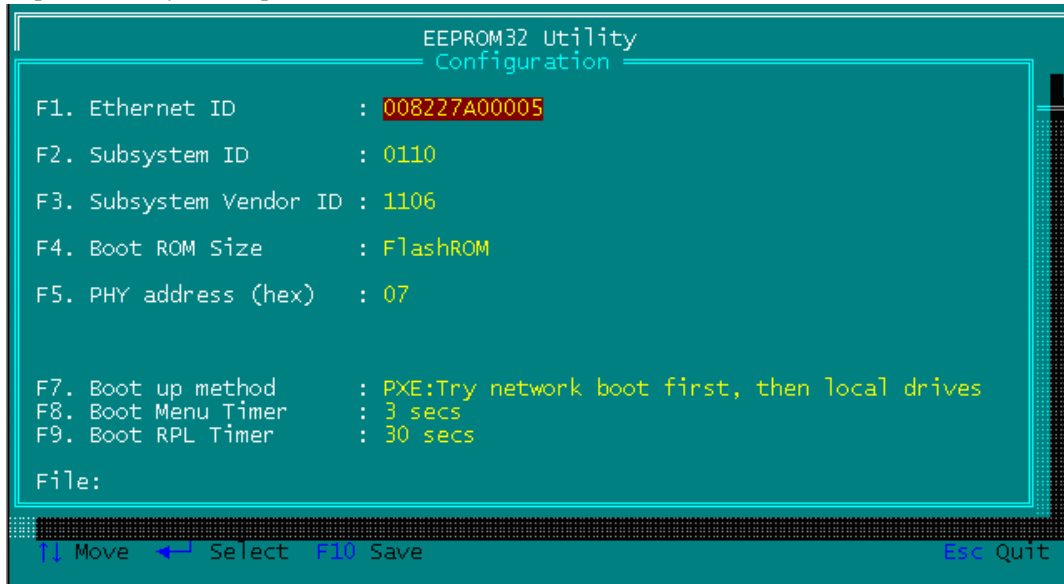
Eeprom utility F1: Create Data File screen:



2. F2: Open Data File

If you want to modify an existed EEPROM data file, you can use this function.

Eeprom utility F2: Open Data File screen:



3. F3: Write to EEPROM

After the EEPROM data file is OK, you can use this function to write the data file into EEPROM.

4. Esc: Exit

Exit this program.

1-2. The EEPROM Utility DOS Menu

Usage: eeprom32 [option]

option:

-?

Help screen.

-h

Help screen.

-p[#] [MAC Address] filename [-i [filename1]] [-o filename2]

Program the EEPROM with data in filename and output the programmed MAC address to filename2 if -o is specified. Use an alternative way to modify MAC address if -i is specified. If filename1 is omitted, the program will read MAC address from the console.

: (1 ~ 6) card number, could be ignored.

[MAC Address]: 12 HEX characters, could be ignored.

p file1.nic : Program file1.nic with first adapter.

p4 rpl.nic : Program rpl.nic with 4th adapter.

For example:

eeeprom32 -p 008227A00005 eeeprom.dat

- Program the EEPROM data with eeeprom.dat but use MAC address 008227A00005.

eeeprom32 -p eeeprom.dat -i macin.txt -o macout.txt

- Program the EEPROM data with eeeprom.dat but use MAC address from macin.txt and output programmed MAC address to macout.txt.

eeeprom32 -p eeeprom.dat -i

- Program the EEPROM data with eeeprom.dat but use MAC address from console input.

-v[#] filename

Verify EEPROM with data in filename.

: (1 ~ 6) card number, could be ignored.

v file1.nic : Verify file1.nic with first adapter.

v4 rpl.nic : Verify rpl.nic with 4th adapter.

-f[#] filename

Write filename with EEPROM data.

: (1 ~ 6) card number, could be ignored.

f file1.nic : Write file1.nic with first adapter.

f4 rpl.nic : Write rpl.nic with 4th adapter.

-bm[#] <19|18|BBS|RPL|NO>

Enable boot up methods.

: (1 ~ 6) card number, could be ignored.

bm 19 : PXE: Try network boot first, then local drives.

bm 18 : PXE: Try local drives boot first, then network.

bm BBS: PXE: Boot according to BIOS setting.

bm RPL: RPL: Try network boot first, then local drives.

bm NO : Local drives boot.

-tm[#] <1|2>

Set Boot Menu Timer Option.

: (1 ~ 6) card number, could be ignored.

tm 1 : Wait 3 seconds for user press Ctrl-Tab to show menu.

tm 2 : Wait 5 seconds for user press Ctrl-Tab to show menu.

-tr[#] <1|2|3|4>

Set Boot RPL Timer Option.

: (1 ~ 6) card number, could be ignored.

tr 1 : Wait 15 seconds for RPL find server timeout.

tr 2 : Wait 30 seconds for RPL find server timeout.

tr 3 : Wait 60 seconds for RPL find server timeout.

tr 4 : wait 120 seconds for RPL find server timeout.

-g[#]

generate 1's compliment checksum and write it to EEPROM 0fh (high byte).

: (1 ~ 6) card number, could be ignored.

-c[#]

check if the checksum stored in EEPROM is valid or not.

: (1 ~ 6) card number, could be ignored.

-km[#] mac-address

Write mac-address to #th NIC's EEPROM MAC address field.

-kv[#] SVID

Write SVID to #th NIC's EEPROM subsys-vendor ID field.

-ks[#] SSID

Write SSID to #th NIC's EEPROM subsys-system ID field.

Exit status:

0 : Command execution success.

1 : Command execution fail.

NOTE:

=====

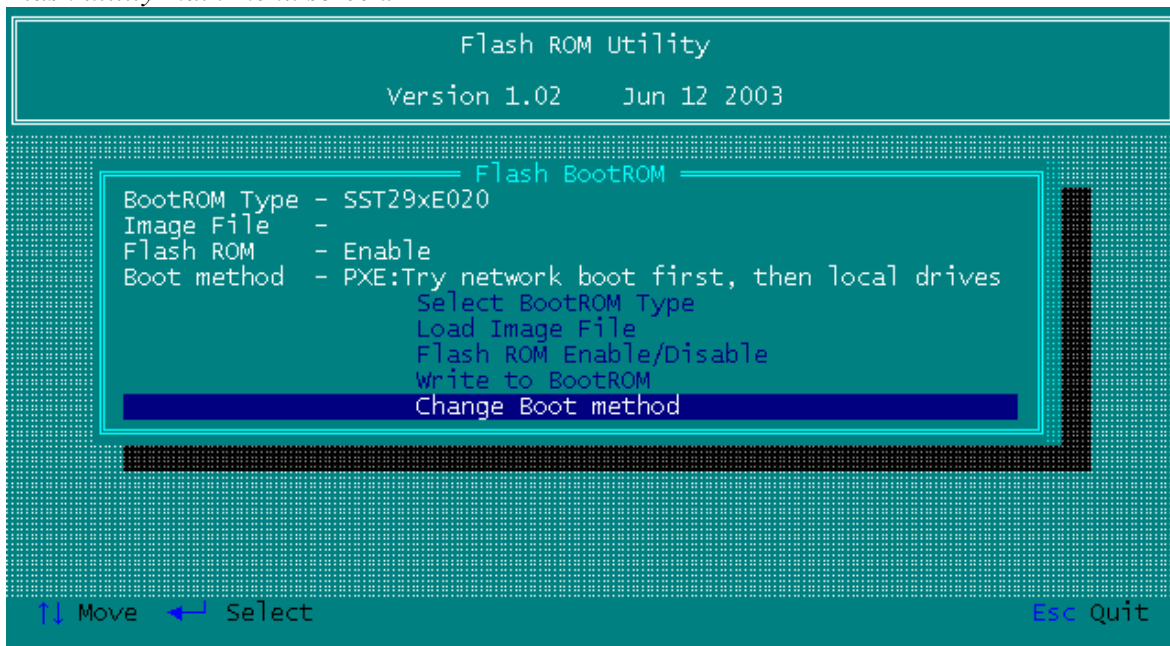
Please do not use EMM386.EXE in the DOS CONFIG.SYS file. It will cause
eeprom32.exe to generate page fault exception.

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2. Flash Utility

The Flash utility provides read/write functions to flash ROM, you can use this program to modify your boot ROM code. If you need PXE with RPL function, you have to select pxe.rpl.nic. If you only need RPL function, you can select getbrom.64. These boot ROM codes are supplied by VIA Networking release driver package.

Flash utility main menu screen:



2-1. The Flash Utility GUI Menu

The Flash utility menu consists of five functions:

1. Select Boot ROM Type:
Choose the flash ROM type of the one mounted on the board.
2. Load Image File:
Load the image file that you are going to write in.

3. Flash ROM Enable/Disable:

Select to enable or disable the flash ROM.

4. Write to Boot ROM:

Select to write the image file to flash ROM.

5. Change Boot Method:

Change the method how you want to boot the system.

2-2. The Flash Utility DOS Menu

Usage: flash32 [option]

option:

-?

Help screen.

-h

Help screen.

-t [flash_type]

Specify the model of the FlashROM to write.

Show all supported FlashROM types if flash_type is not given.

-tm[#] <1|2>

Set Boot Menu Timer Option.

: (1 ~ 6) card number, could be ignored.

tm 1 : Wait 3 seconds for user press Ctrl-Tab to show menu.

tm 2 : Wait 5 seconds for user press Ctrl-Tab to show menu.

-tr[#] <1|2|3|4>

Set Boot RPL Timer Option.

: (1 ~ 6) card number, could be ignored.

tr 1 : Wait 15 seconds for RPL find server timeout.

tr 2 : Wait 30 seconds for RPL find server timeout.

tr 3 : Wait 60 seconds for RPL find server timeout.
tr 4 : wait 120 seconds for RPL find server timeout.

-p[#] filename

Program Boot ROM with data in filename.

: (1 ~ 6) card number, could be ignored.

-p file.img : Program file.img with first card

-p3 file.img : Program file.img with 3th card.

-v[#] filename

Verify Boot ROM with data in filename.

: (1 ~ 6) card number, could be ignored.

-v file.img : Verify file.img with first card.

-v3 file.img : Verify file.img with 3th card.

-f[#] filename

Create a file by Boot ROM content.

: (1 ~ 6) card number, could be ignored.

-f file.img : Create file.img with first card.

-f3 file.img : Create file.img with 3th card.

-c[#] filename

Check Boot ROM image's device ID.

: (1 ~ 6) card number, could be ignored.

-c file.img : Check device ID in file.img with first card.

-c3 file.img : Check device ID in file.img with 3th card.

-e[#] [0|16|32|64]

Enable or disable Boot ROM.

: (1 ~ 6) card number, could be ignored.

0 to disable boot ROM.

16 to enable 16K EPROM.

32 to enable 32K EPROM.

64 to enable 64K EPROM or FlashROM.

Please reboot computer to enable Boot ROM.

-bm[#] <19|18|BBS|RPL|NO>

Enable boot up method.

: (1 ~ 6) card number, could be ignored.

bm 19 : PXE: Try network boot first, then local drives.

bm 18 : PXE: Try local drives boot first, then network.

bm BBS: PXE: Boot according to BIOS setting.

bm RPL: RPL: Try network boot first, then local drives.

bm NO : Local drives boot.

Exit status:

0 Command execution success.

1 Command execution fail.

NOTE:

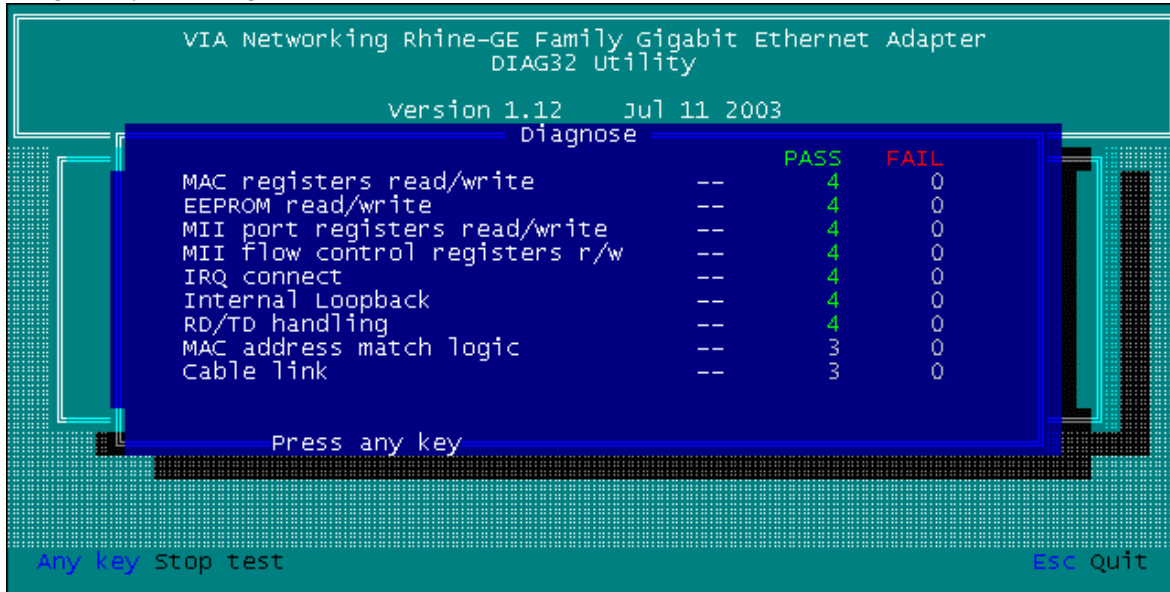
=====

Please do not use EMM386.EXE in the DOS CONFIG.SYS file. It will cause flash32.exe to generate page fault exception.

3. Diag Utility

The Diag utility provides basic function test for the NIC. The test suite is divided as the follows:

Diag utility F5: diagnose test screen:



3-1. The Diag utility GUI Menu

The Diag utility menu will show the following items:

1. I/O Base Address:
I/O base address is assigned by PCI BIOS and can not be modified.
2. Interrupt Output Line:
Interrupt Output Line is assigned by PCI BIOS and can not be modified.
3. Connection Type:
The physical media connection type currently you had connected.
4. Boot ROM:
You can select Boot ROM to 64K/FlashROM or No Boot ROM. Boot ROM base address is

assigned by PCI BIOS and can not be modified.

5. Ethernet Address:

Ethernet MAC address of this card.

6. Chip Type:

Chip type of this card.

7. Host Interface:

Host interface of this card.

8. PCI-X compatible

Compatible with PCI-X or not.

If the Host Interface is 32-bit only, then no this item.

Key definition:

=====

F1: Help screen.

F4: Change boot ROM size.

F5: Diagnose this network adapter.

F6: Network test in Master/Slave mode.

F7: WOL test in Link on/off or Waker/Sleeper mode.

F8: Change connection type.

F10: Select to be compatible with PCI-X or not.

If the Host Interface is 32-bit only, then no this item.

Diag utility main menu screen:

```

VIA Networking Rhine-GE Family Gigabit Ethernet Adapter
DIAG32 Utility

Version 1.12    Jul 11 2003

----- Configuration -----
I/O Base Address      - 0xD000
Interrupt Output Line  - IRQ 5
Connection Type       - Auto - No Link
Boot ROM              - No Boot ROM
Ethernet Address      - 008227A00005
Chip Type             - VT6120
Host Interface        - 32 bit 33/66Mhz PCI bus

F1 Help  F4 BootROM  F5 Diagnose  F6 Network test  F7 WOL test  Esc Quit
F8 Change Connection Type

```


3-2. The Diag Utility DOS Menu

Usage: diag32 [-[OPTION][NUMBER] [-[OPTION][NUMBER]...]]

Command line options:

-?

show help.

-h

show help.

-e#

Miscellaneous switches.

: (1 - 3) function number.

e1: Disable shared IRQ support.

e2: No test cable link in diagnostic.

e3: External loopback test in diagnostic.

-d#

Specify auto-test function to diagnose.

: (1 ~ 6) card number, could be ignored.

d: auto-test with first adapter.

d4: auto-test with 4th adapter.

-f#

Specify the frequency of auto-test function.

This parameter should be used together with auto-test parameters like

-d or -p.

: (1 ~ 4294967295) test times, could be ignored.

f: auto-test continuously, never stop.

f100: auto-test 100 times.

f65536: auto-test 65536 times.

-m#

Initialize with forced mode.

: (1 ~ 4) connection type.

m1: 100BaseTx Half-Duplex mode.

m2: 100BaseTx Full-Duplex mode.

m3: 10BaseT Half-Duplex mode.

m4: 10BaseT Full-Duplex mode.

-p#

Specify auto-test function to 2-card network test.

: (0 | 1 | 60 - 1514) packet size selection.

p0: 2-card test with increased packet size.

p1: 2-card test with random packet size.

p60: 2-card test with fixed packet size 60 bytes.

p512: 2-card test with fixed packet size 512 bytes.

-n# [len]

Specify auto-test function to network pingpong test.

: (1 - 6) card number, could be ignored.

len : (0 | 1 | 60 - 1514) packet size selection.

0: pingpong test with increased packet size.

1: pingpong test with random packet size.

60: pingpong test with fixed packet size 60 bytes.

512: pingpong test with fixed packet size 512 bytes.

If len is omitted then use fixed packet size 60 bytes.

-k#

Show MAC address, SVID, SSID, PHY ID in EEPROM of the card.

: (1 - 6) card number, could be ignored.

-c

Show EEPROM checksum checking & SVID/SSID on UI.

-mac# -ioxx ix [va]

MAC register read/write function.

: (1 - 6) card number, could be ignored.

ioxx: Specify IO access type for MAC register read/write

iobr: byte read IO access.

iobw: byte write IO access.

iowr: word read IO access.

ioww: word write IO access.

iodr: dword read IO access.

iodw: dword write IO access.

ix: register index.

va: register value for write.

For example: -mac -iobr 5f: byte read MAC reg 5f.

For example: -mac -ioww c0 0030: word write MAC reg c0 0030.

-mii# -ioxx ix [va]

MII register read/write function.

: (1 - 6) card number, could be ignored.

ioxx: Specify IO access type for MII register read/write.

iowr: word read IO access.

ioww: word write IO access.

ix: register index.

va: register value for write.

For example: -mii -iowr 03: word read MII reg 03.

For example: -mii -ioww 03 0030: word write MII reg 03 0030.

-t

Enable RAMBIST test in Diagnose Test.

-ieee

Enable IEEE Test function.

Exit status:

0 Command execution success.

1 Command execution fail.

For example:

```
diag32 -m1 -d -f100
```

- Run diagnose test in 100BaseTx Half-Duplex mode and repeat 100 times.

```
diag32 -m1 -p1514 -f100
```

- Run 2-card network test in 100BaseTx Half-Duplex mode with packet size 1514 bytes and send 100 packets.

```
diag32 -m3 -p1 -f100
```

- Run 2-card network test in 10BaseTx Half-Duplex mode with random packet size and send 100 packets.

NOTE:

=====

Please do not use EMM386.EXE in the DOS CONFIG.SYS file. It will cause diag32.exe to generate page fault exception.

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4. Mass Production Program Overview

4-1. Introduction to MPE

The MPE is a test batch file for VIA Networking Rhine-GE Family Gigabit Ethernet Adapter. It contains eeprom and flash and diag utilities. These programs are included in VIA Networking release driver package for OEM customer. The MPE batch file can test EEPROM read/write and flash boot ROM read/write. Diag utility is a functional test program for one card or multiple cards in factory mass production process.

4-2. Hardware Requirements

Two PC machines are required for MPE production program. The minimum requirements are:

Tester PC:

RAM – 32 MB.

Processor – 8086 or above.

Hard Disk – 100MB minimum free space.

Test Adapters – The MPE test must have at least one NIC adapter installed. You can also test multiple cards in the PC machine, but the maximum number is four NIC adapters.

Server PC:

RAM – 32 MB.

Processor – 8086 or above.

Hard Disk – 100MB minimum free space.

Test Adapters – The server PC must have one NIC adapter installed. This machine is used as a pingpong server of the network Tx/Rx test.

4-3. Software Requirements

The MPE test batch file and test tools are supplied by VIA Networking Inc.

OS: MS-DOS 6.22 above.

Test software:

1. mpe.bat
2. eeprom32.exe and eeprom.cfg
3. flash32.exe and pxerpl.nic
4. diag32.exe
5. dos4gw.exe

4-4. MPE Test Procedures

One Card Test :

In Server PC:

1. Start the MS-DOS and copy all MPE test utilities to VIA directory, but you must make the directory first.
2. In DOS mode type:
diag32 <enter>
3. Enter F6: Network Test, select "slave workstation".

In Tester PC:

1. Start the MS-DOS and copy all MPE test utilities to VIA directory, but you must make the directory first.
2. In DOS mode type:
mpe <enter>
3. You can view the screen as the follows. If the test has any error occurred, the program will break and display the error item.

Diagnose test screen:

```

VIA Networking Rhine-GE Family Gigabit Ethernet Adapter
DIAG32 Utility

Version 1.12 Jul 11 2003
Diagnose

MAC registers read/write      -- PASS FAIL
                               4      0
EEPROM read/write            -- 4      0
MII port registers read/write -- 4      0
MII flow control registers r/w -- 4      0
IRQ connect                   -- 4      0
Internal Loopback             -- 4      0
RD/TD handling                -- 4      0
MAC address match logic       -- 3      0
Cable link                    -- 3      0

Press any key

Any key Stop test                               Esc Quit

```

Network test Master screen:

```

VIA Networking Rhine-GE Family Gigabit Ethernet Adapter
Master Station

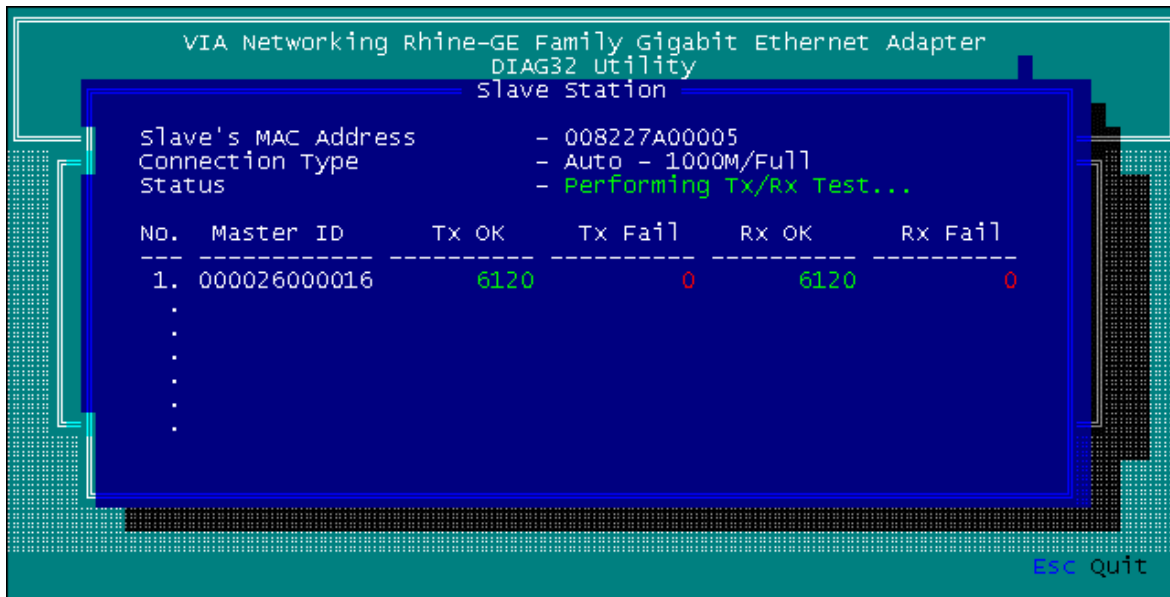
Sender's Ethernet Address:      000026000016
Responder's Ethernet Address:   008227A00005
Connection Type:                Auto - 1000M/Full
Packet Length:                  60

Packets SENT: ..... 6120
Packets RECEIVED: ..... 6120
Packets sent DMA error: ..... 0
Packets sent abort: ..... 0
Packets sent collision: ..... 0
Packets received alignment error: ..... 0
Packets received fifo overflow error: ... 0
Packets serial no. error: ..... 0
Packets no response: ..... 0
Packets received data error: ..... 0

Esc Quit

```

Network test Slave screen:



Multi-Card Test :

In Server PC:

1. Start the MS-DOS and copy all MPE test utilities to VIA directory, but you must make the directory first.
2. In DOS mode type:
diag32 <enter>
3. Enter F6: Network Test, select "slave workstation".

In Tester PC:

1. Start the MS-DOS and copy all MPE test utilities to VIA directory, but you must make the directory first.
2. For example, if you want to test 2 cards, in DOS, type:
mpe 1 2 <enter>
3. For example, if you want to test 4 cards, in DOS, type:
mpe 1 2 3 4 <enter>
4. You can view the screen as above. If the test has any error occurred, the program will break and display the error item. In multi-card test, before testing the next card, the test will pause for you to view the test result.

The MPE test result:

```
VIA Network Inc for Rhine-GE Gigabit NIC Mass Production Program
*****
Testing card 1 ...
Write MAC Address & Flash Code Test
Programming EEPROM...
Ethernet ID: 008227A00005 OK.
Subsystem ID: 0110 OK.
Subsystem Vendor ID: 1106 OK.
-----
Detected flash ROM Type:          SST29xE020
card 1: Write MAC Address Test Success
card 1: Write Flash Code Test Success
*****
card 1: Diagnose Test in Auto Mode
card 1: Diagnose Test in Auto Mode Success
card 1: Diagnose Test in 100HD Mode
card 1: Diagnose Test in 100HD Mode Success
card 1: Diagnose Test in 100FD Mode
card 1: Diagnose Test in 100FD Mode Success
card 1: Diagnose Test in 10HD Mode
card 1: Diagnose Test in 10HD Mode Success
card 1: Diagnose Test in 10FD Mode
card 1: Diagnose Test in 10FD Mode Success
card 1: Network Test in Auto Mode
card 1: Network Test in Auto Mode Success
card 1: Network Test in 100HD Mode
card 1: Network Test in 100HD Mode Success
card 1: Network Test in 100FD Mode
card 1: Network Test in 100FD Mode Success
card 1: Network Test in 10HD Mode
card 1: Network Test in 10HD Mode Success
card 1: Network Test in 10FD Mode
card 1: Network Test in 10FD Mode Success
Testing card 1 Success

      PASS

C:\TEMP>
```



The MPE test pauses to show the result and waiting for any key to continue:

```
card 1: Diagnose Test in 10HD Mode Success
card 1: Diagnose Test in 10FD Mode
card 1: Diagnose Test in 10FD Mode Success
card 1: Network Test in Auto Mode
card 1: Network Test in Auto Mode Success
card 1: Network Test in 100HD Mode
card 1: Network Test in 100HD Mode Success
card 1: Network Test in 100FD Mode
card 1: Network Test in 100FD Mode Success
card 1: Network Test in 10HD Mode
card 1: Network Test in 10HD Mode Success
card 1: Network Test in 10FD Mode
card 1: Network Test in 10FD Mode Success
Testing card 1 Success
```

PASS

Press any key to continue . . .

The MPE test item fail screen:

VIA Network Inc for Rhine-GE Gigabit NIC Mass Production Program

```
*****
Testing card 1 ...
Write MAC Address & Flash Code Test
-----
```

```
Programming EEPROM...
Ethernet ID: 008227A00005 OK.
Subsystem ID: 0110 OK.
Subsystem Vendor ID: 1106 OK.
-----
```

Detected flash ROM Type: SST29xE020

```
card 1: Write MAC Address Test Success
card 1: Write Flash Code Test Success
*****
```

```
card 1: Diagnose Test in Auto Mode
Test Item Fail
Test card 1 Fail
*****
```

FAIL

C:\TEMP>