How to check Nand flash error issue

#Background

In some cases, the device can't boot up and show error message like "NAND read from offset 6820000 failed -77" in console log during booting progress.

This issue may be fixed by formating NAND flash and reinstalling sysloader and StoneOS. This document describes how to format NAND flash and reinstal sysloader and StoneOS. If it still get the error message during installing sysloader or StoneOS, it indicates that the NAND flash is physically broken and need to be replaced.

#Error message example

```
HILLSTONE NETWORKS
Hillstone Bootloader 2-2.0.2 15:51:35(Apr 23 2015)
Product S/N: 2307411150000226 Assembly number: C103
Hardware CPLD version: 6.0  2015/2/10 15:9
Platform: SG-6000-T5060
LMC0 init.........................done
LMC1 init.........................done
DRAM: 8 GB
BOOTROM: 512 KB
Press ESC to stop autoboot:  0
Loading SG6000-T-5.5R3P4.3.bin
NAND read from offset 6820000 failed -77
Fatal Error: read image
hsimg_check : failed
SG6000-T-5.5R3P4.3.bin is corrupted
Please use sysloader to boot a new firmware
```

It shows same error when loading sysloader and reinstal sysloader before formating NAND flash

```
###Loading Sysloader failed###
HILLSTONE NETWORKS
Hillstone Bootloader 2-2.0.2 15:51:35(Apr 23 2015)
Product S/N: 2307411150000226 Assembly number: C103
Hardware CPLD version: 6.0  2015/2/10 15:9
Platform: SG-6000-T5060
LMC0 init.........................done
LMC1 init.........................done
DRAM: 8 GB
BOOTROM: 512 KB
Press ESC to stop autoboot:  4
Run on-board sysloader? [y]/n: y
Loading: ##NAND read from offset 1e0000 failed -5
Fatal Error: read sysloader
Press any key to reset the board...
Reseting the board...
```

###Reinstalling Sysloder Failed###
HILLSTONE NETWORKS
Hillstone Bootloader 2-2.0.2 15:51:35(Apr 23 2015)
Product S/N: 2307411150000226 Assembly number: C103
Hardware CPLD version: 6.0 2015/2/10 15:9

Platform: SG-6000-T5060

LMC0 init........................done
LMC1 init........................done
DRAM: 8 GB
BOOTROM: 512 KB

Press ESC to stop autoboot: 4
Run on-board sysloader? [y]/n: n
Get a sysloader image via TFTP? [y]/n: y

NOTE: The sysloader can be upgraded via MGT0

address [0.0.0.0/0   ] : 192.168.1.1/24
server [0.0.0.0   ] : 192.168.1.99
gateway [0.0.0.0   ] : 192.168.1.254
filename   : sysloader-2.1.6

Loading: ###

Load complete: 8799060 bytes loaded
Do you want to save this sysloader? [y]/n: y
Saving .NAND write to offset 120000 failed -5

Fatal Error: Failed to save sysloader

#Step by step guide

1. Connect the device via console and reboot the device

```
B# reboot
System reboot, are you sure? [y]/n: y
2 configuration in system, please choose one to be loaded.
=================================================================
        Name      Version Save Time           Size (bytes)
-----------------------------------------------------------------
    [a]: Startup   5.5R5   2018-01-17 23:23:13 34841
    [b]: Backup 0  5.5R4   2017-12-05 05:20:14 30420
=================================================================
Press enter to use system current setting
Please choose one:
2018-01-18 01:00:13, Event CRIT@MGMT: BFM reboot by hillstone via Console.
2018-01-18 01:00:17, Event CRIT@NET: interface ethernet0/5 turn to physical down
2018-01-18 01:00:17, Event WARNING@NET: interface ethernet0/5 turn to link down
Requesting system reboot
```

2. When message "Press ESC to stop autoboot: 4 " prompt, input command "hillstone-bootloader" to enter bootloader system

```
HILLSTONE NETWORKS
Hillstone Bootloader 3-2.0.18 09:12:47(Sep 27 2016)
Product S/N: 2508120140006837 Assembly number: B056

Platform: SG-6000-E1100

LMC0 init........................done
DRAM: 1 GB
BOOTROM: 512 KB

Press ESC to stop autoboot:  4
###paste command "hillstone-bootloader" to enter bootloader###
bootloader#
```

3. Enter diagnostic with command "diagnostic" , select the option "Test Nand Flash". During the test , the Nand Flash will be formatted.

```
bootloader#
bootloader# diagnostic
```

```
Welcome Hillstone Diagnostic Menu: diagnostic firewall
Press the menu number and Enter to execute command

0               Execute all tests step by step
1               Set board platform information
2               Test Basic Memory
3               Test Nand Flash
4               Test Leds
5               Test RTC
6               Test Clear button
7               Test Ethernet
8               Test DS2460 chip
9               Read config file
a               Load bootloader
b               Load sysloader
c               Load burnin image

# 3
The NAND flash 0 information: size 512 MB, sector size 128 KB oobblock 2048 oobsize 64
Write 0xAA to nand flash offset 0x20000
Writing and reading is the same. OK
Erasing all blocks... OK
Bad blocks: 2

#
```

4. Exit the bootloader system with command "exit" and reboot the device with command "reset"

```
# exit
bootloader# reset
```

5. Re-install the sysloader

```
HILLSTONE NETWORKS
Hillstone Bootloader 3-2.0.18 09:12:47(Sep 27 2016)
Product S/N: 2508120140006837 Assembly number: B056

Platform: SG-6000-E1100

LMC0 init.........................done
DRAM: 1 GB
BOOTROM: 512 KB

Press ESC to stop autoboot:   5
Run on-board sysloader? [y]/n: n
Get a sysloader image via TFTP? [y]/n: y

NOTE: The sysloader can be upgraded via eth0/0

address [0.0.0.0/0      ]  : 111.111.111.110
server  [0.0.0.0        ]  : 111.111.111.111
gateway [0.0.0.0        ]  :
filename                   : sysloader-3-4.0.3.bin


Load address: 0x20000000
Loading: ##############################################
done

Load complete: 22155264 bytes loaded
Do you want to save this sysloader? [y]/n: y
```

Saving................done

6. Re-install StoneOS

```
Sysloader 3-4.0.0.3 Jun 24 2016 - 08:29:38


1      Load firmware via TFTP
2      Load firmware via FTP
3      Load firmware from USB disks (not available)
4      Select backup firmware as active
5      Show on-board firmware
6      Reset
sysloader# 5
Error: No active image
sysloader# 1

NOTE: The firmware can be upgraded via eth0/0

Local ip address      [0.0.0.0/0      ]: 111.111.111.110
Server ip address     [0.0.0.0        ]: 111.111.111.111
Gateway ip address    [0.0.0.0        ]:
File name                   : SG6000-M-3-5.5R5F1-v6.bin
SG6000-M-3-5.5R5F1-v 100% |*****************************| 67748k  0:00:00 ETA

Verified OK

Save this image? [y]/n: y
Saving ...........................................................
Checking saved firmware ................................................... OK

Set SG6000-M-3-5.5R5F1-v6.bin as active boot image
sysloader# 5
Active        SG6000-M-3-5.5R5F1-v6.bin
sysloader# 6


HILLSTONE NETWORKS
Hillstone Bootloader 3-2.0.18 09:12:47(Sep 27 2016)
Product S/N: 2508120140006837 Assembly number: B056

Platform: SG-6000-E1100

LMC0 init........................done
DRAM: 1 GB
BOOTROM: 512 KB

Press ESC to stop autoboot:  0

Loading SG6000-M-3-5.5R5F1-v6.bin
##############################

Load complete: 69373952 bytes loaded
Boot OS...
MGD: Open config file /flash/config/vsys_config.conf failed
...........................................No valid license, just load the default configuration! ...
.


--------------------------------------------------------------------------------
```

```
                    Welcome

            Hillstone   Networks
----------------------------------------------------------------------------------
Hillstone StoneOS Software Version 5.5
Copyright (c) 2009-2017 by Hillstone Networks

login:
```

7. If the error still shows out , the hardware need to be replaced.