ESB2/Gilgal Root Cause Description and resolution
Intel LAN Adapter Division (LAD)
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# Executive Summary

Two issues have been found related to the functionality of the Ethernet MAC in the Intel®
631xESB/632xESB I/O Controller Hub (ESB2).  These issues might cause connectivity and/or
performance problems with the Ethernet interfaces of this device.

The first issue is related to contention between the management and payload interfaces of the Ethernet
MAC. This can occur with use of either the internal Baseboard Management Controller (BMC) or an
external BMC.

The second issue is specific to Receive Side Scaling (RSS).

This notification is intended to help customers identify the symptoms, provide root cause, and document
resolution of these issues.

# Identify Symptoms and Root Cause

## *Symptoms*

The symptoms reported that were related to these issues can be broken down into several failure modes.

1.) Random link loss on the network interface.

2.) Intermittent failure during LAN PXE boot.

3.) System hangs encountered while exiting PXE. A system reboot is required for recovery.

4.) Network interface hangs under heavy BMC traffic.

5.) A yellow "bang" appears in Windows Device Manager.

6.) A yellow "bang" appears on the Windows taskbar and in Device Manager. A system reboot is
required to fix/resume normal functionality.

7.) Failure of the receive functionality when RSS is enabled.

## *Root Causes:*

The root causes for the symptoms previously described are explained as follows:

**Failure Modes 1-6**

Several issues were discovered related to how the firmware (EEPROM, BMC), and software (driver) access registers in the ESB2 MAC.

Timing issues related to the access to these registers could cause either the firmware or software to hang due to their inability to access the registers in a timely manner, or could cause corruption of those registers.

To resolve these issues fixes were required to the firmware (EEPROM and/or BMC) and the driver.

- For platforms using the ESB2's internal BMC, a fix was required in the BMC firmware.
  - o For EPSD platforms listed later in this document, this fix was incorporated into the BMC 64 release.
  - o For designs using an external BMC, fixes were incorporated into the EEPROM images, as noted later in this document.
  - o Customers using ESB2's internal BMC who have written their own firmware should contact their local Intel representative.
- All designs using the ESB2 MAC require an updated driver, as listed later in this document.

**Failure Mode 7 (RSS)**

The root cause of this issue is a hardware logic bug that hangs the RX DMA when RSS is enabled with data in the packet buffer. A fix has been incorporated into the 13.5 driver package in the driver to ensure that the packet buffer is empty when RSS is enabled. This driver can be found in the Resolution section that follows.

# Resolution

Resolution involves downloading a combination of new drivers, firmware, and/or EEPROM images.

The following table provides a reference as to what components need to be updated for a particular type of platform.

| Platform Type | Updated BMC Firmware | Update EEPROM Image SVK 2.5 or Greater | Updated Linux Driver |
|---|---|---|---|
| EPSD/MCPD board using internal BMC | R | NR | R |
| Internal BMC | R | S | R |
| External BMC | | R | R |
| No BMC | | S | R |
| R = Required<br>NR = Not Required<br>S = Highly suggested, but not necessary | | | |

## *Intel EPSD Platforms:*

Following also is a list of the Intel EPSD platforms, and the location of the download location for the BMC Firmware and Drivers. For other issues related to these platforms, please contact your appropriate Intel support contact.

| EPSD Platform [1] | Product Name | Firmware/Driver Package [2] |
|---|---|---|
| S5000PSL S5000XVN S5000XSL | Star Lake and Vernonia | http://www.intel.com/support/motherboards/server/s5000psl/ |
| S7000FC4UR | Foxcove | http://www.intel.com/support/motherboards/server/s7000fc4ur/ |
| S5000PAL S5000XAL | Alcolu | http://www.intel.com/support/motherboards/server/s5000pal/index.htm |
| S5400SF | Shoffner | http://www.intel.com/support/motherboards/server/S5400SF/index.htm |
| S5000VSA | Sapello | http://www.intel.com/support/motherboards/server/s5000vsa/index.htm |
| S5000VCL | Callahan | http://www.intel.com/support/motherboards/server/s5000vcl/index.htm |
| [1] MCPD platforms that use the ESB2 MAC in their designs are also affected by these changes.<br><br>[2] Linux/FreeBSD driver: The newest driver available on sourceforge.net for the ESB2, e1000e version 0.5.8.2 or later.<br><br>*Note: Current and future support for the ESB2 driver has been moved from the e1000 to the e1000e distribution for Linux.* | | |

## OEM Platforms

### Drivers:

Linux/FreeBSD driver: The newest driver available on sourceforge.net for the ESB2, e1000e version 0.5.8.2 or later.

*Note: Current and future support for the ESB2 driver has been moved to the e1000e distribution.*

### EEPROM Images

Images in SVK v2.5 address issues related to semaphore timing as well as more robust handling of MDIC transactions. This EEPROM update in combination with the use of an updated driver can help customers using external BMCs.  The SVK v2.5 distribution can be found in CDI at:

http://www.intel.com/cd/edesign/library/asmo-na/eng/348715.htm

**Document ID:-**348715
**Title:-**Intel® 82563EB/82564EB Gigabit Ethernet PHY – Utility Software ESB2 Sample Validation Kit (SVK) – Rev. 2.5

For customers that require custom EEPROM images designs, please contact Mike Stratton for assistance in creating them.

### BMC Firmware:

Customers who implement their own firmware for the ESB2 BMC should contact their Intel representative for information related to this fix.