REALTEK

RTL810xx Series

DEEP SLUMBER MODE (DSM)

APPLICATION NOTES

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TRADEMARKS

USING THIS DOCUMENT

This document is intended for the engineer's reference and provides detailed application information.

Though every effort has been made to ensure that this document is current and accurate, more information may have become available subsequent to the production of this guide. In that event, please contact your Realtek representative for additional information that may help in the development process.

REVISION HISTORY

Revision	Release Date	Summary
1.0	2008/01/23	First release.
1.1	2008/02/05	Revised section 2, page 1

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1.   Introduction

This application note will help board layer designers to implement the Deep Slumber Mode (DSM) power saving feature for Realtek's RTL810xx series of Fast Ethernet Controllers.

2.   Deep Slumber Mode Implementation

- When DSM is enabled, the BIOS must:

   - Enable Isolate_Dis_LAN (*Set I/O Register offset 0x55 Bit4 to 1h*) (no need to clear even if DSM is disabled)
   - Enable DSM_en (*Set I/O Register Offset 0x6D Bit7 to 1h*)
   - Enable LDPS (*Set PHY Register Offset 0x11 Bit12 to 1h*).
   - The above steps must be done **before** entering the Windows system, and must follow the below steps **after** the local machine enters the Windows system.

- The board designer must provide a circuit to poll the OGPIO pin. The BIOS then monitors the OGPIO to determine whether a cable is connected. We recommend the BIOS polls the OGPIO every 1s.

- When a cable is unplugged, the OGPIO will go from low to high The BIOS must set configuration space offset 0x44 to 03h first (the Ethernet Controller enters D3 state) and then cut off VCC33 (see Figure 1, page 2) and ask the local machine's OS to run a Hardware Scan, which will then remove the Ethernet Controller.

- On connection of a cable, the OGPIO will go from high to low. The BIOS must provide VCC33 and (after 100ms) ask the local machine's OS to run a Hardware Scan in order to recover all resources (E.g., IO space and Memory address). The system is then restored to a normal state.

- When DSM is disabled, the BIOS must disable DSM_en (*Set I/O Register Offset 0x6D Bit7 to 0h*) and stop to poll the OGPIO pin.

Note 1: If Deep Slumber Mode is enabled and the network cable is unplugged, and the OS then enters S3, S4, or S5 power states, the Ethernet Controller will not support Wake-on-LAN (WOL).

Note 2: If implementing EEPROM_Less and DSM Modes at the same time, the BIOS must provide the SVID, SDID, and Serial Number to the RTL810xx after ISOLATEB goes from low to high.

Note 3: If the system does not provide auxiliary power to our chip in S3/S4 states, the BIOS must enable DSM_en again when the system resumes from S3/S4 state.

Note 4: When DSM mode is implemented, the BIOS must declare _RMV code in the ACPI.

Note 5: When DSM mode is implemented, please use the recommended driver revision:
Windows Vista: 6.203 or later
Windows XP: 5.688 or later

Note 6: If the board designer wants to use ISOLATEB to disable the Ethernet Controller, follow the steps below:

Step 1. Set I/O Register Offset 0x6E Bit0 to 0h (BIOS disables DSM).

Step 2. Set I/O register Offset 0x6F Bit7 to 0h.

Step 3. Set configuration space offset 0x44 to 03h (the Ethernet Controller enters D3 state).

Step 4. Cut-off VCC33 (see Figure 1, page 2).

Step 5. If the board designer wants to enable the Ethernet Controller, provide VCC33 and set I/O register Offset 0x6F Bit7 to 1h.
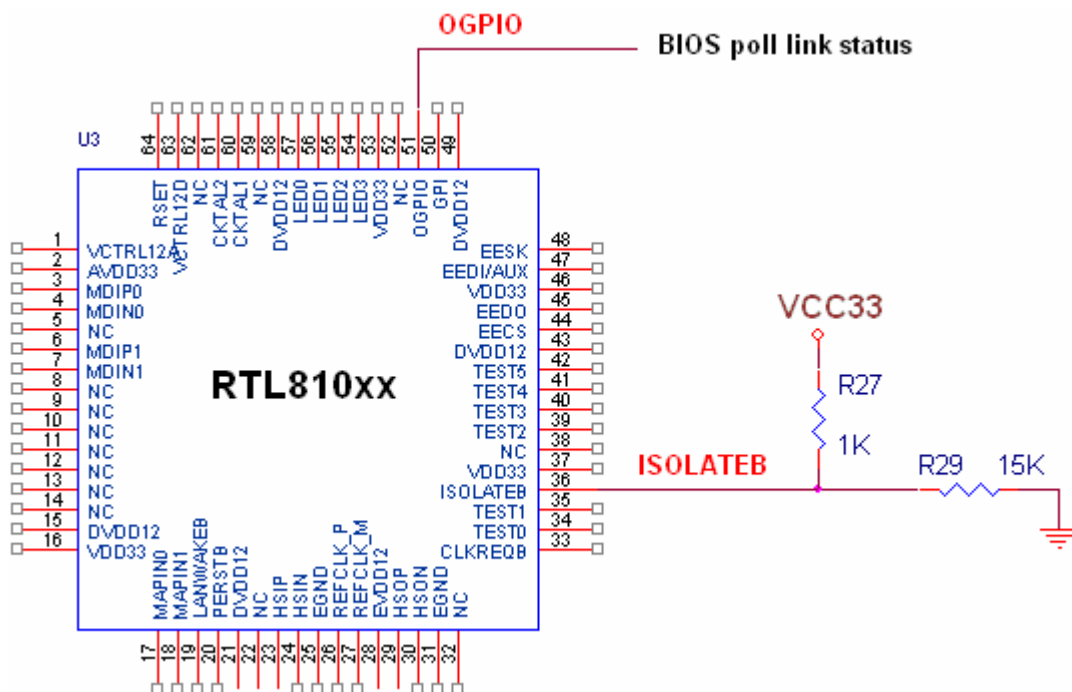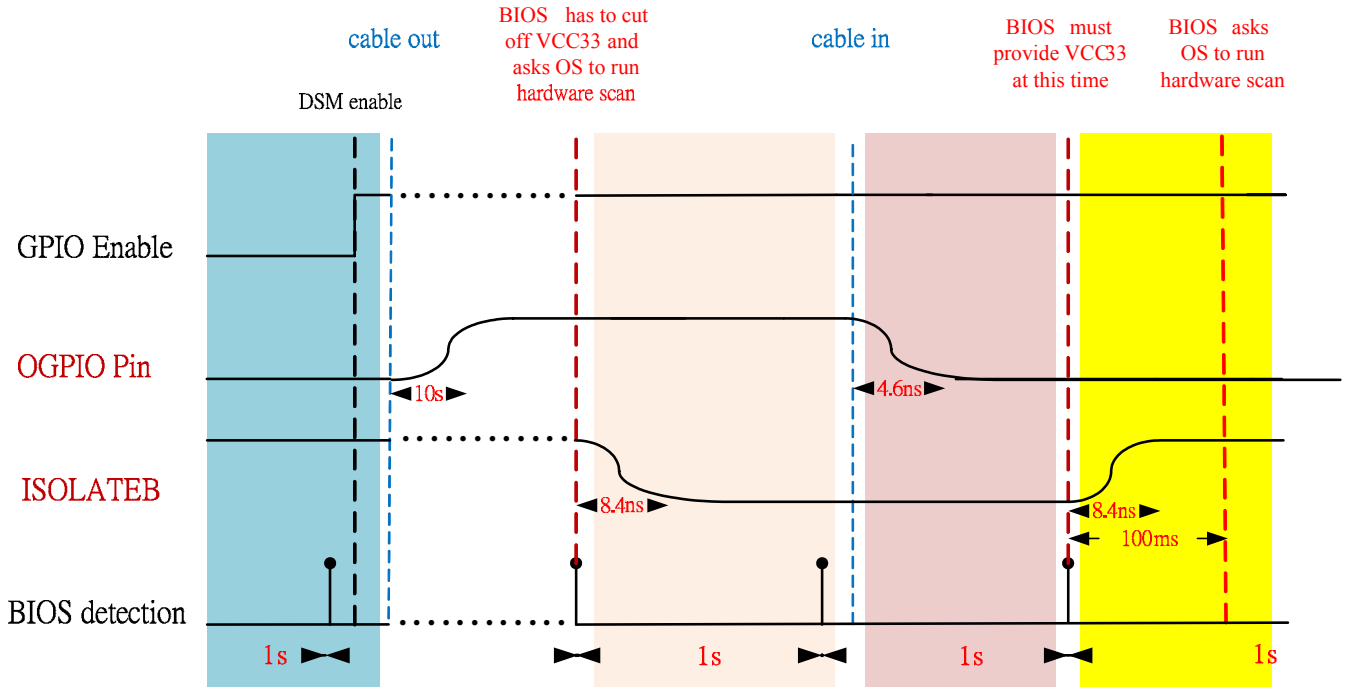

Figure 1.   OGPIO and ISOLATEB Circuit

Figure 2.   Deep Slumber Mode Operation

3.   Whole Card Power Consumption

Table 1.   Whole Card Power Consumption

State	Current (mA)	Power (mW)
Normal (Cable Connected)	201	663.3
Link Down Power Saving	79	261.7
Deep Slumber Mode (DSM)	30	99