**Proposed Draft** **Serial ATA International Organization**

**Revision 17**
**11/28/2012**

# TPR046v17_SATA31_TransitionalEnergyReporting
# Title : Transitional Energy Reporting
# Sponsors: Microsoft, Intel

This is an internal working document of the Serial ATA International Organization. As such, this is not a completed standard and has not been approved. The Serial ATA International Organization may modify the contents at any time. This document is made available for review and comment only.

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## Document History

| Version | Date | Comments |
|---|---|---|
| 00 | 11/29/2011 | • Initial release. |
| 01 | 12/16/2011 | • Added power graphic.<br>• Swapped time unit and time value bit positions to align time values on byte boundaries. |
| 02 | 01/25/2012 | • Moved graphics into normative section<br>• Updated graphics to show shaded areas<br>• Moved time scale values into tables |
| 03 | 02/06/2012 | • Fixed Typos<br>• Fixed figure 2 |
| 04 | 03/16/2012 | • Fixed references to PM0 from P0<br>• Added definition for transition time measurement tolerance<br>• Changed the unit range for Table 3 |
| 05 | 03/26/2012 | • Removed tolerance staments and moved them to a note<br>• Updated graphs and explanation to denote full energy cost of the transition. |
| 06 | 03/31/2012 | • Editorial updates per last conference call |
| 07 | 06/06/2012 | • Added in state DevSleep power and workload defintion |
| 08 | 07/18/2012 | • Added material to break out PM states and link state costs |
| 09 | 08/30/2012 | • Updated Diagrams |
| 10 | 09/05/2012 | • Added cost and diagram for transitioning to PM0:Active from Power off relative to DevSleep/PM2:Standby |
| 11 | 09/20/2012 | • Typo fix and added note that all Fs means no recoup possible |
| 12 | 10/07/2012 | • Added statements throughout that all Fs means no recoup possible<br>• Added statements throughout to define which units applies to each time value<br>• Fixed typos |
| 13 | 10/22/2012 | • Updated figures to show zero power at power off<br>• Fixed typos |
| 14 | 11/01/2012 | • Resolves issues presented in digital group<br>• References to FIS34 removed<br>• Reference to ACS-3 added for PM states<br>• Updated log table to match ACS-3/SATA sync (TP44)<br>• General typos |
| 15 | 11/07/2012 | • Corrects log table |
| 16 | 11/13/2012 | • Add references<br>• fix wording as proposed by WG<br>• removed PM0:Active to off bits and description |
| 16a | 11/26/2012 | • Format table and description update |
| 17 | 11/28/2012 | • Member review |

 

# 1 Introduction

Systems need to determine the best policies to minimize power consumption. In order to accomplish this they instruct devices to enter 'almost off' states or completely remove power from the device itself. The system should be aware of the expense to enter and exit these conditions, in an effort to be efficient.

This proposal outlines how a SATA device may report the transitional energy expense of entering/exiting DEVSLP and removing/restoring power to a device.

Additionally, this proposal outlines how a SATA device may report how often it can power cycle.

# 2 Technical Specification Changes

The following additions are based on the content of Serial ATA Revision 3.1, 18-July-2011. Proposed additions to SATA 3.1 text are marked in blue and underline. Proposed deletions to SATA 3.1 text are marked in ~~red~~. Black text is the original SATA 3.1 text. Section headers correspond to the section in SATA 3.1 into which the proposed text is to be inserted.

 

# 3 [editor's note: 13.7] SATA Logs

### 3.1.1 [editor's note: 13.7.7] Identify Device Data Log (30h)

#### 3.1.1.1 [editor's note: 13.7.7.1] Serial ATA Settings (page 08h)

Editor's note: TPR038 added byte 30h..37h.
Editor's note: TPR044 changed SATA rev 3.1 Table 95 as shown in black text.

Table 95 – - Serial ATA (page 08h)

| Offset | Type | Content |
|---|---|---|
| 0..7 | QWord | Serial ATA page information header.<br>**Bit** **Meaning**<br>63 Shall be set to one.<br>62:24 Reserved<br>23:16 Page Number. Shall be set to 08h.<br>15:0 Revision number. Shall be set to 0001h |
| 8..15 | QWord | SATA Capabilities<br>**Bit** **Meaning**<br>63 Shall be set to one<br>62:29 Reserved<br>28 DIPM SSP PRESERVATION SUPPORTED (see 13.7.7.2.24)<br>27 Reserved<br>26 DEVSLEEP_TO_REDUCEDPWRSTATE CAPABILITY SUPPORTED (see 13.7.7.2.23)<br>25 DEVICE SLEEP SUPPORTED (see 13.7.7.2.22)<br>24 NCQ AUTOSENSE SUPPORTED (see 13.7.7.2.12)<br>23 SOFTWARE SETTINGS PRESERVATION SUPPORTED (see 13.7.7.2.20)<br>22 HARDWARE FEATURE CONTROL SUPPORTED (see 13.7.7.2.19)<br>21 IN-ORDER DATA DELIVERY SUPPORTED (see 13.7.7.2.18)<br>20 DEVICE INITIATED POWER MANAGEMENT SUPPORTED (see 13.7.7.2.17)<br>19 DMA SETUP FIS AUTO-ACTIVATE SUPPORTED (see 13.7.7.2.16)<br>18 NON-ZERO BUFFER OFFSETS SUPPORTED (see 13.7.7.2.15)<br>17 SEND AND RECEIVE QUEUED COMMANDS SUPPORTED (see 13.7.7.2.14) |

 

| | | |
|---|---|---|
| | | 16 NCQ QUEUE MANAGEMENT COMMAND SUPPORTED (see 13.7.7.2.13)<br>15 NCQ STREAMING SUPPORTED (see 13.7.7.2.12)<br>14 READ LOG DMA EXT AS EQUIVALENT TO READ LOG EXT SUPPORTED (see 13.7.7.2.11)<br>13 DEVICE AUTOMATIC PARTIAL TO SLUMBER TRANSITIONS SUPPORTED (see 13.7.7.2.10)<br>12 HOST AUTOMATIC PARTIAL TO SLUMBER TRANSITIONS SUPPORTED (see 13.7.7.2.9)<br>11 NCQ PRIORITY INFORMATION SUPPORTED (see 13.7.7.2.8)<br>10 UNLOAD WHILE NCQ COMMANDS ARE OUTSTANDING SUPPORTED (see 13.7.7.2.7)<br>9 SATA PHY EVENT COUNTERS LOG SUPPORTED (see 13.7.7.2.6)<br>8 RECEIPT OF HOST INITIATED POWER MANAGEMENT REQUESTS SUPPORTED (see 13.7.7.2.5)<br>7 NCQ FEATURE SET SUPPORTED (see 13.7.7.2.4)<br>6:3 Reserved<br>2 SATA GEN3 SIGNALING SPEED SUPPORTED (see 13.7.7.2.3)<br>1 SATA GEN2 SIGNALING SPEED SUPPORTED (see 13.7.7.2.2)<br>0 SATA GEN1 SIGNALING SPEED SUPPORTED (see 13.7.7.2.1) |
| 16..23 | QWord | Current SATA Settings |
| | | **Bit** **Meaning**<br>63 Shall be set to one<br>62:11 Reserved<br>10 DEVICE SLEEP ENABLED (see 13.7.7.3.9)<br>9 AUTOMATIC PARTIAL TO SLUMBER TRANSITIONS ENABLED (see 13.7.7.3.8)<br>8 SOFTWARE SETTINGS PRESERVATION ENABLED (see 13.7.7.3.7)<br>7 HARDWARE FEATURE CONTROL IS ENABLED (see 13.7.7.3.6)<br>6 IN-ORDER DATA DELIVERY ENABLED (see 13.7.7.3.5)<br>5 DEVICE INITIATED POWER MANAGEMENT ENABLED (see 13.7.7.3.4)<br>4 DMA SETUP AUTO-ACTIVATION ENABLED (see 13.7.7.3.3)<br>3 NON-ZERO BUFFER OFFSETS ENABLED (see 13.7.7.3.2)<br>2:0 CURRENT NEGOTIATED SERIAL ATA SIGNAL SPEED (see 13.7.7.3.1) |
| 24..39 | | Reserved |

 

| | | |
|---|---|---|
| 40..41 | Word | CURRENT HARDWARE FEATURE CONTROL IDENTIFIER (see 13.7.7.3.10) |
| 42..43 | Word | SUPPORTED HARDWARE FEATURE CONTROL IDENTIFIER (see 13.7.7.3.11) |
| 44..47 | | Reserved |
| 48..55 | QWord | DEVSLP TIMING VARIABLES |
| | | **Bit** **Meaning**<br>63 ~~Shall be set to one~~DEVSLP SUPPORTED (see 13.7.7.4.new)<br>62:16 Reserved<br>15:8 DEVSLEEP EXIT TIMEOUT (DETO) (see 13.7.7.4.1)<br>7:5 Reserved<br>4:0 MINIMUM DEVSLP ASSERTION TIME (MDAT) (see 13.7.7.4.2) |
| 56..63 | QWord | TRANSITIONAL ENERGY REPORTING |
| | | **Bit** **Meaning**<br>63 TER SUPPORTED (see 13.7.7.5.new.14)<br>62:55 Reserved<br>54:53 IN-STATE DEVSLEEP POWER UNIT (see 13.7.7.5.new.13)<br>52:48 TYPICAL IN-STATE DEVSLEEP POWER (see13.7.7.5.new.12)<br>47:46 OFF TO GOOD STS LATENCY TIME UNIT (see 13.7.7.5.new.11)<br>45:40 OFF TO GOOD STS LATENCY (see 13.7.7.5.new.10)<br>39:38 BETWEEN POWER CYCLES TIME UNIT (see 13.7.7.5.new.9)<br>37:24 RECOMMENDED TIME BETWEEN POWER CYCLES (see 13.7.7.5.new.8)<br>23:22 OFF TO GOOD STS TIME UNIT (see 13.7.7.5.new.7)<br>21:16 OFF TO GOOD STS RECOUP COST (see 13.7.7.5.new.6)<br>15:14 DEVSLEEP TO PHYRDY TIME UNIT (see 13.7.7.5.new.5)<br>13:8 DEVSLEEP TO PHYRDY RECOUP COST (see 13.7.7.5.new.4)<br>7:6 SLUMBER TO DEVSLEEP TIME UNIT (see 13.7.7.5.new.3)<br>5:0 SLUMBER TO DEVSLEEP RECOUP COST (see 13.7.7.5.new.2) |
| 64..71 | QWord | TRANSITIONAL ENERGY REPORTING EXTENDED |
| | | **Bit** **Meaning**<br>63 TERE SUPPORTED (see 13.7.7.5.new.14)<br>62:47 Reserved<br>46:45 IN-STATE SLUMBER POWER UNITS (see 13.7.7.5.new.13) |

| | | |
|---|---|---|
| | | 44:40 TYPICAL IN-STATE SLUMBER POWER (see 13.7.7.5.new.12)<br>39:38 PM2 TO PM0 LATENCY TIME UNIT (see 13.7.7.5.new.11)<br>37:32 PM2 TO PM0 LATENCY (see 13.7.7.5.new.10)<br>31:30 OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 TIME UNIT (see 13.7.7.5.new.9)<br>29:24 OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 RECOUP COST (see 13.7.7.5.new.8)<br>23:22 DEVSLEEP/PM2 TO OFF TIME UNIT (see 13.7.7.5.new.7)<br>21:16 DEVSLEEP/PM2 TO OFF RECOUP COST (see 13.7.7.5.new.6)<br>15:14 PM2 TO PM0 TIME UNIT (see 13.7.7.5.new.5)<br>13:8 PM2 TO PM0 RECOUP COST (see 13.7.7.5.new.4)<br>7:6 PM0 TO PM2 TIME UNIT (see 13.7.7.5.new.3)<br>5:0 PM0 TO PM2 RECOUP COST (see 13.7.7.5.new.2) |
| ~~56~~72..511 | | Reserved |

Editor's note: TPR044 added 13.7.7.4 DEVSLP TIMING VARIABLES

#### 3.1.1.1.1 [editor's note: 13.7.7.4.new] DEVSLP SUPPORTED bit

If the DEVSLP SUPPORTED bit is set to one, then the device supports DEVSLP TIMING VARIABLES.

### 3.1.1.1.2 [editor's note: 13.7.7.5.new] TRANSITIONAL ENERGY REPORTING

### 3.1.1.1.3 [editor's note: 13.7.7.5.new.1] Overview

See ACS-3 for descriptions of PM0:Active and PM2:Standby.

The TRANSITIONAL ENERGY REPORTING field is defined as follows:

a) The TRANSITIONAL ENERGY REPORTING field is valid only under typical device operating parameters (e.g. temperature); and

b) The TRANSITIONAL ENERGY REPORTING field only relates to the transition to the requested power states, described in this subclause, immediately preceded by 32, 1MB random write requests.

#### 3.1.1.1.3.1 [editor's note: 13.7.7.5.new.2] *SLUMBER TO DEVSLEEP RECOUP COST* field

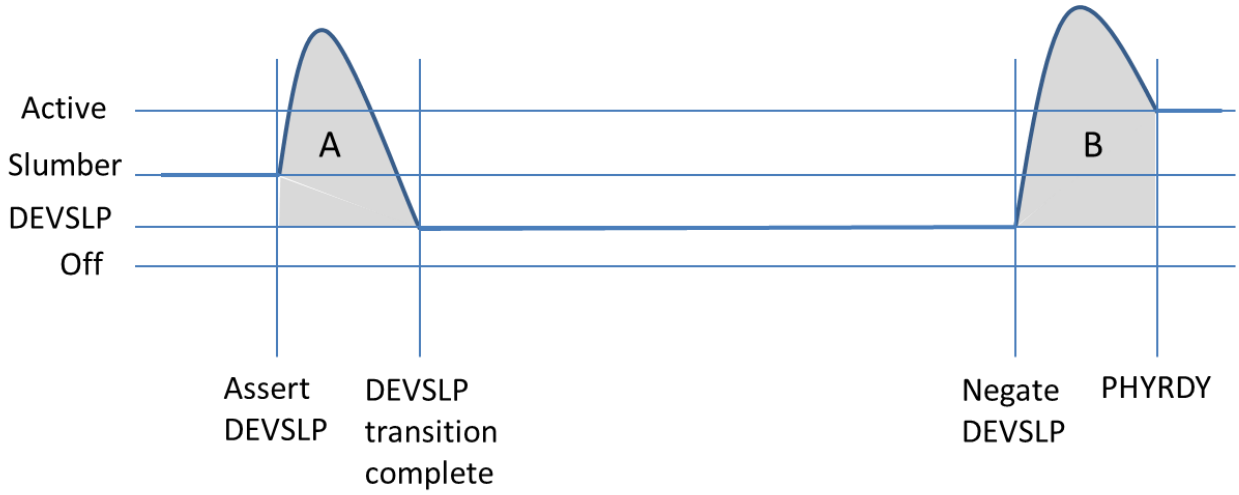


Figure 4.1.1.1-1 - Transitional Energy: Slumber to DevSleep and DevSleep to PHYRDY

The SLUMBER TO DEVSLEEP RECOUP COST field indicates the nominal number of time units the device needs to remain in a DevSleep interface power state in order to recoup the energy consumed by transitioning to the DevSleep interface power state from the Slumber interface power state, relative to operating in the Slumber interface power state. If the SLUMBER TO DEVSLEEP RECOUP COST field is set to zero then the device does not support reporting the Slumber to DevSleep transitional energy. The amount of energy consumed during the transition to the DevSleep interface power state is measured from assertion of the DEVSLP sideband signal until the device completes transition to the DevSleep interface power state. If the SLUMBER TO DEVSLEEP RECOUP COST field is set to all ones then transitioning to the DevSleep interface power state from the Slumber interface power state has no power advantage.

Note: The accuracy of the nominal value of the SLUMBER TO DEVSLEEP RECOUP COST field may change over time.

The area under the curve, above the DEVSLP interface power state line, between assertion of the DEVSLP sideband signal and the transition to the DevSleep interface power state (see shaded area A in figure 4.1.1.1-1) is the energy consumed to calculate the Slumber to DevSleep transitional energy time value (SLUMBER TO DEVSLEEP RECOUP COST field).

#### 3.1.1.1.3.2 [editor's note: 13.7.7.5.new.3] *SLUMBER TO DEVSLEEP TIME UNIT* field

The SLUMBER TO DEVSLEEP TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the SLUMBER TO DEVSLEEP RECOUP COST field.

Table 4.1.1.1-1 – Transition Time Units

| Value | Time Units |
|---|---|
| 0 | • 1 millisecond units |
| • 1 | • 10 millisecond units |
| • 2 | • 100 millisecond units |
| • 3 | • 1 second units |

#### 3.1.1.1.3.3 [editor's note: 13.7.7.5.new.4] DEVSLEEP TO PHYRDY RECOUP COST field

The DEVSLEEP TO PHYRDY RECOUP COST field indicates the nominal recommended number of time units the device needs to remain in a DevSleep interface power state in order to recoup the energy consumed by transitioning to PHYRDY from the DevSleep interface power state, relative to operating in the PHYRDY state. If the DEVSLEEP TO PHYRDY RECOUP COST field is set to zero then the device does not

support reporting the DevSleep to PHYRDY transitional energy. The amount of energy consumed during the transition to the PHYRDY is measured from negation of the DEVSLP sideband signal until PHYRDY.

Note: The accuracy of the nominal value in the DEVSLEEP TO PHYRDY RECOUP COST field may change over time.

The area under the curve and above the DEVSLP interface state line, between negation of the DEVSLP sideband signal and PHYRDY (see shaded area B in figure 4.1.1.1-1) is the energy consumed to calculate the DEVSLP to PHYRDY transitional energy time value (DEVSLEEP TO PHYRDY RECOUP COST field).

#### 3.1.1.1.3.4 [editor's note: 13.7.7.5.new.5] DEVSLEEP TO PHYRDY TIME UNIT field

The DEVSLEEP TO PHYRDY TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the DEVSLEEP TO PHYRDY RECOUP COST field.

#### 3.1.1.1.3.5 [editor's note: 13.7.7.5.new.6] OFF TO GOOD STS RECOUP COST field

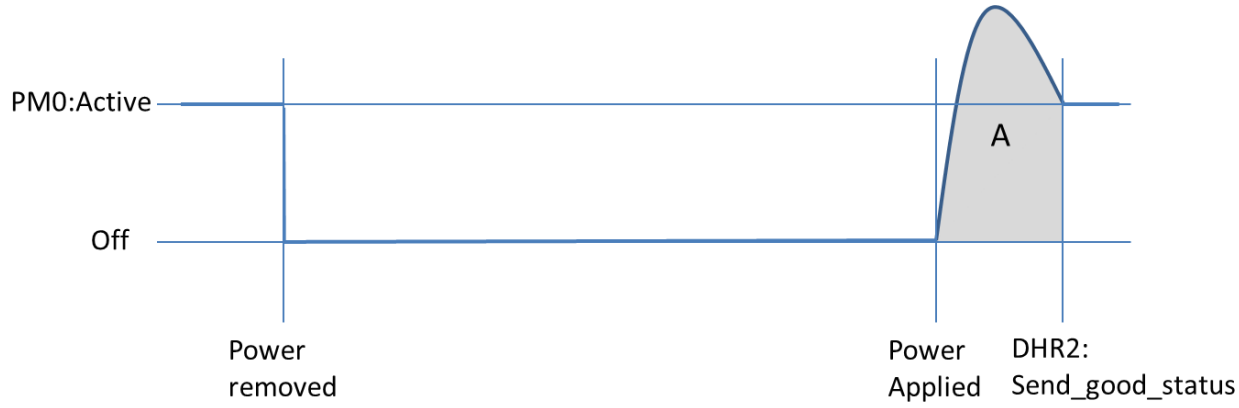


Figure 4.1.1.1-2 - Transitional Energy: PM0:Active to Off and Off to PM0:active

The OFF TO GOOD STS RECOUP COST field indicates the nominal number of time units the device needs to remain in the Power Off condition in order to recoup the energy consumed between DHR2: Send_good_status (see 11.1) from Off, relative to operating in the PM0:Active state. If the OFF TO GOOD STS RECOUP COST field is set to zero then the device does not support reporting Off to DHR2: Send_good_status transitional energy. The amount of energy consumed during the transition is measured from Power On until DHR2: Send_good_status.

Note: The accuracy of the nominal value in the OFF TO GOOD STS RECOUP COST field may change over time.

The area under the curve and above the Off line between Power On and DHR2: Send_good_status (see shaded area A in figure 4.1.1.1-2) is the energy consumed to calculate the Off to DHR2: Send_good_status transitional energy time value (OFF TO GOOD STS RECOUP COST field).

#### 3.1.1.1.3.6 [editor's note: 13.7.7.5.new.7] OFF TO GOOD STS TIME UNIT field

The OFF TO GOOD STS TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the OFF TO GOOD STS RECOUP COST field.

#### 3.1.1.1.3.7 [editor's note: 13.7.7.5.new.8] RECOMMENDED TIME BETWEEN POWER CYCLES field

The RECOMMENDED TIME BETWEEN POWER CYCLES field indicates the recommended number of minimum time units between power cycles.

#### 3.1.1.1.3.8 [editor's note: 13.7.7.5.new.9] BETWEEN POWER CYCLES TIME UNIT field

The BETWEEN POWER CYCLES TIME UNIT field indicates the time units as defined in Table 4.1.1.1-2 represented in the RECOMMENDED TIME BETWEEN POWER CYCLES field.

Table 4.1.1.1-2 – Power Cycle Time Units

| Value | Time Units |
|---|---|
| 0 | • 1 millisecond units |
| • 1 | • 1 second units |
| • 2 | • 10 second units |
| • 3 | • 30 second units |

#### 3.1.1.1.3.9 [editor's note: 13.7.7.5.new.10] OFF TO GOOD STS LATENCY field

The OFF TO GOOD STS LATENCY field indicates the typical number of time units to transition from Power Off to DHR2: Send_good_status.

#### 3.1.1.1.3.10 [editor's note: 13.7.7.5.new.11] OFF TO GOOD STS LATENCY TIME UNIT field

The OFF TO GOOD STS LATENCY TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the OFF TO GOOD STS LATENCY field.

#### 3.1.1.1.3.11 [editor's note: 13.7.7.5.new.12] TYPICAL IN-STATE DEVSLEEP POWER field

The TYPICAL IN-STATE DEVSLEEP POWER field indicates the typical number of in-state power units consumed while the device is in the DevSleep interface power state.

#### 3.1.1.1.3.12 [editor's note: 13.7.7.5.new.13] IN-STATE DEVSLEEP POWER UNIT field

The IN-STATE DEVSLEEP POWER UNIT field indicates the power units as defined in Table 4.1.1.1-3 represented in the TYPICAL IN-STATE DEVSLEEP POWER field.

Table 4.1.1.1-3 – Power Units

| Value | Power Units |
|---|---|
| 0 | • 1 milliwatts units |
| • 1 | • 10 milliwatts units |
| • 2 | • 100 milliwatts units |
| • 3 | • 1 watt units |

#### 3.1.1.1.3.13 [editor's note: 13.7.7.5.new.14] TER SUPPORTED bit

If the TER SUPPORTED bit is set to one, then the device supports TRANSITIONAL ENERGY REPORTING.

### 3.1.1.1.4 [editor's note: 13.7.7.5.new] TRANSITIONAL ENERGY REPORTING EXTENDED

#### 3.1.1.1.4.1 [editor's note: 13.7.7.5.new.1] Overview

See ACS-3 for descriptions of PM0:Active and PM2:Standby.

The TRANSITIONAL ENERGY REPORTING EXTENDED field is defined as follows:

a) The TRANSITIONAL ENERGY REPORTING EXTENDED field is valid only under typical device operating parameters (e.g. temperature); and

b) The TRANSITIONAL ENERGY REPORTING EXTENDED field only relates to the transition to the requested power states, described in this subclause, immediately preceded by 32, 1MB random write requests.

 

#### 3.1.1.1.4.2 [editor's note: 13.7.7.5.new.2] PM0 TO PM2 RECOUP COST field

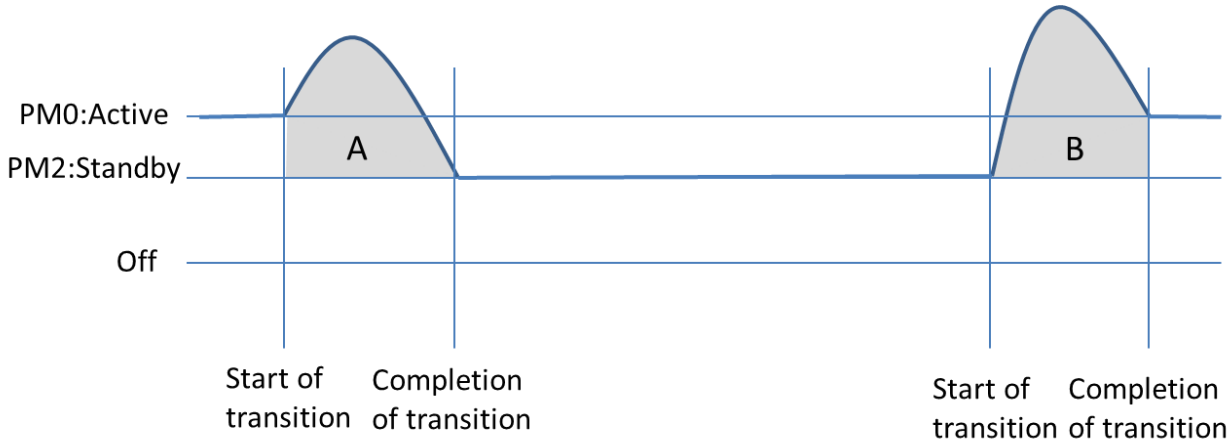


Figure 4.1.1.2-1 - Transitional Energy: PM0:Active to PM2:Standby and PM2:Standby to PM0:Active

The PM0 TO PM2 RECOUP COST field indicates the nominal number of time units the device needs to remain in the PM2:Standby state in order to recoup the energy consumed by transitioning to the PM2:Standby state from the PM0:Active state, relative to operating in the PM0:Active state. If the PM0 TO PM2 RECOUP COST field is set to zero then the device does not support reporting the PM0:Active to PM2:Standby transitional energy. The amount of energy consumed during the transition to the PM2:Active state is measured from issue of the STANDBY IMMEDIATE command until the device completes transition to the PM2:Standby state. If the PM0 TO PM2 RECOUP COST field is set to all ones then transitioning to the PM2:Standby interface power state from the PM0:Active interface power state has no power advantage.

Note: The accuracy of the nominal value in the PM0 TO PM2 RECOUP COST field may change over time.

#### 3.1.1.1.4.3 [editor's note: 13.7.7.5.new.3] PM0 TO PM2 TIME UNIT field

The PM0 TO PM2 TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the PM0 TO PM2 RECOUP COST field.

#### 3.1.1.1.4.4 [editor's note: 13.7.7.5.new.4] PM2 TO PM0 RECOUP COST field

The PM2 TO PM0 RECOUP COST field indicates the nominal recommended number of time units the device needs to remain in the PM2:Standby state in order to recoup the energy consumed by transitioning to the PM0:Active state from the PM2:Standby state, relative to operating in the PM0:Active state. If the PM2 TO PM0 RECOUP COST field is set to zero then the device does not support reporting the PM2:Standby to PM0:Active transitional energy. The amount of energy consumed during the transition to the PM0:Active is measured from any command issued that causes the device to exit PM2:Active until PM0:Active.

Note: The accuracy of the nominal value in the PM2 TO PM0 RECOUP COST field may change over time.

#### 3.1.1.1.4.5 [editor's note: 13.7.7.5.new.5] PM2 TO PM0 TIME UNIT field

The PM2 TO PM0 TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the PM2 TO PM0 RECOUP COST field.

 

#### 3.1.1.1.4.6 [editor's note: 13.7.7.5.new.6] DEVSLEEP/PM2 TO OFF RECOUP COST field

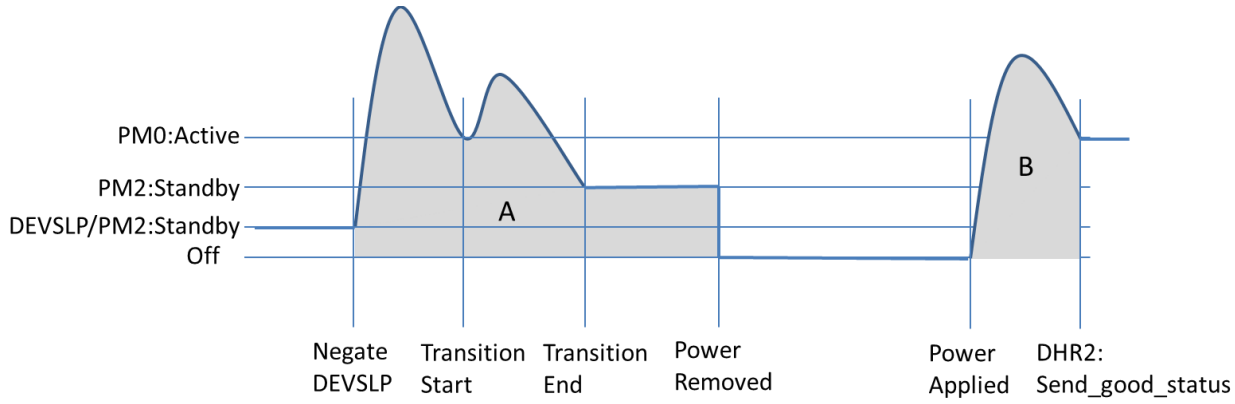


Figure 4.1.1.2-2 - Transitional Energy: DevSleep/PM2:Standby to PM0:Active and Off to DHR2: Send_good_status

The DEVSLEEP/PM2 TO OFF RECOUP COST field indicates the nominal recommended number of time units the device needs to remain in the Power Off condition in order to recoup the energy consumed by transitioning to the Power Off state from the DevSleep interface power state/PM2:Standby state, relative to operating in the DevSleep Interface Power state/PM2:Standby state. If the DEVSLEEP/PM2 TO OFF RECOUP COST field is set to zero then the device does not support reporting the DevSleep/PM2:Standby to Power Off transitional energy. The amount of energy consumed during the transition to the Power Off condition is measured from the exit of the DevSleep Interface Power State, transitioning to PM0:Active, transitioning to PM2:Standby, and then transitioning to Power Off. If the DEVSLEEP/PM2 TO OFF RECOUP COST field is set to all ones then transitioning to the Power Off state from the DevSleep interface power state/PM2:Standby state has no power advantage.

Note: The accuracy of the nominal value in the DEVSLEEP/PM2 TO OFF RECOUP COST field may change over time.

#### 3.1.1.1.4.7 [editor's note: 13.7.7.5.new.7] DEVSLEEP/PM2 TO OFF TIME UNIT field

The DEVSLEEP/PM2 TO OFF TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the DEVSLEEP/PM2 TO OFF RECOUP COST field.

#### 3.1.1.1.4.8 [editor's note: 13.7.7.5.new.8] OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 RECOUP COST field

The OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 RECOUP COST field indicates the nominal recommended number of time units the device needs to remain in the Power Off condition in order to recoup the energy consumed by transitioning to the PM0:Active state from the Off state, relative to operating in the DevSleep Interface Power state/PM2:Standby state. If the OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 RECOUP COST field is set to zero then the device does not support reporting the recoup cost of exiting Power Off to DHR2: Send good status relative to DevSleep/PM2:Standby. The amount of energy consumed during the transition to the PM0:Active state is measured from Power On, transitioning to PM0:Active, and exiting DHR2: Send_good_status, relative to operating in the DevSleep/PM2:Standby state.

#### 3.1.1.1.4.9 [editor's note: 13.7.7.5.new.9] OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 TIME UNIT field

The OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the OFF TO GOOD STS RELATIVE TO DEVSLEEP/PM2 RECOUP COST field.

#### 3.1.1.1.4.10 [editor's note: 13.7.7.5.new.10] PM2 TO PM0 LATENCY field

The PM2 TO PM0 LATENCY field indicates the typical number time units to transition from PM2:Standby to PM0:Active.

 

#### 3.1.1.1.4.11 [editor's note: 13.7.7.5.new.11] PM2 TO PM0 LATENCY TIME UNIT field

The PM2 TO PM0 LATENCY TIME UNIT field indicates the time units as defined in Table 4.1.1.1-1 represented in the PM2 TO PM0 LATENCY field.

#### 3.1.1.1.4.12 [editor's note: 13.7.7.5.new.12] TYPICAL IN-STATE SLUMBER POWER field

The TYPICAL IN-STATE SLUMBER POWER field indicates the typical number of in-state power units consumed while the device is in the Slumber interface power state.

#### 3.1.1.1.4.13 [editor's note: 13.7.7.5.new.13] IN-STATE SLUMBER POWER UNITS field

The IN-STATE SLUMBER POWER UNITS field indicates the power units as defined in Table 4.1.1.1-3 represented in the TYPICAL IN-STATE SLUMBER POWER field.

#### 3.1.1.1.4.14 [editor's note: 13.7.7.5.new.14] TERE SUPPORTED bit

If the TERE SUPPORTED bit is set to one, then the device supports TRANSITIONAL ENERGY REPORTING EXTENDED.

 