

TSB12LV26-EP

OHCI-Lynx™ PCI-Based IEEE 1394 Host Controller

Data Manual

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1 Introduction

1.1 Description

The Texas Instruments TSB12LV26 device is a PCI-to-1394 host controller compliant with the *PCI Local Bus Specification*, *PCI Bus Power Management Interface Specification*, IEEE Std 1394-1995, and *1394 Open Host Controller Interface Specification*. The chip provides the IEEE 1394 link function and is compatible with 100M bits/s, 200M bits/s, and 400M bits/s serial bus data rates.

As required by the *1394 Open Host Controller Interface Specification* (OHCI) and IEEE Std 1394a-2000, internal control registers are memory-mapped and nonprefetchable. The PCI configuration header is accessed through configuration cycles specified by PCI and provides plug-and-play (PnP) compatibility. Furthermore, the TSB12LV26 device is compliant with the *PCI Bus Power Management Interface Specification*, per the *PC 99 Design Guide* requirements. TSB12LV26 device supports the D0, D2, and D3 power states.

The TSB12LV26 design provides PCI bus master bursting and is capable of transferring a cacheline of data at 132M bytes/s after connection to the memory controller. Since PCI latency can be large, deep FIFOs are provided to buffer 1394 data.

The TSB12LV26 device provides physical write posting buffers and a highly-tuned physical data path for SBP-2 performance. The TSB12LV26 device also provides multiple isochronous contexts, multiple cacheline burst transfers, advanced internal arbitration, and bus-holding buffers on the PHY/link interface.

An advanced CMOS process achieves low power consumption and allows the TSB12LV26 device to operate at PCI clock rates up to 33 MHz.

1.2 Features

The TSB12LV26-EP device supports the following features:

- Controlled Baseline
- One Assembly/Test Site, One Fabrication Site
- Extended Temperature Performance of -40°C to 110°C
- Enhanced Diminishing Manufacturing Sources (DMS) Support
- Enhanced Product Change Notification
- Qualification Pedigree[†]
- 3.3-V and 5-V PCI bus signaling
- 3.3-V supply (core voltage is internally regulated to 1.8 V)
- Serial bus data rates of 100M bits/s, 200M bits/s, and 400M bits/s
- Physical write posting of up to three outstanding transactions
- Serial ROM interface supports 2-wire devices
- External cycle timer control for customized synchronization
- PCI burst transfers and deep FIFOs to tolerate large host latency
- Two general-purpose I/Os
- Fabricated in advanced low-power CMOS process
- Packaged in 100-terminal LQFP (PZ)
- PCI_CLKRUN protocol

[†] Component qualification in accordance with JEDEC and industry standards to ensure reliable operation over an extended temperature range. This includes, but is not limited to, Highly Accelerated Stress Test (HAST) or biased 85/85, temperature cycle, autoclave or unbiased HAST, electromigration, bond intermetallic life, and mold compound life. Such qualification testing should not be viewed as justifying use of this component beyond specified performance and environmental limits.

1.3 Related Documents

- *1394 Open Host Controller Interface Specification* (Revision 1.0)
- *IEEE Standard for a High Performance Serial Bus* (IEEE Std 1394-1995)
- *IEEE Standard for a High Performance Serial Bus—Amendment 1* (IEEE Std 1394a-2000)
- *PC 99 Design Guide*
- *PCI Bus Power Management Interface Specification* (Revision 1.0)
- *PCI Local Bus Specification* (Revision 2.2)
- *Serial Bus Protocol 2* (SBP-2)

1.4 Trademarks

OHCI-Lynx and is a trademark of Texas Instruments.

Other trademarks are the property of their respective owners.

1.5 Ordering Information

| ORDERING NUMBER | NAME | VOLTAGE | PACKAGE | TOP-SIDE MARKING |
|-----------------|--|--------------------------|-------------------|------------------|
| TSB12LV26TPZEP | OHCI-Lynx™ PCI-Based IEEE 1394 Host Controller | 3.3 V, 5 V Tolerant I/Os | 100-Terminal PQFP | TSB12LV26TEP |

2 Terminal Descriptions

This section provides the terminal descriptions for the TSB12LV26 device. Figure 2–1 shows the signal assigned to each terminal in the package. Table 2–1 is a listing of signal names arranged in terminal number order, and Table 2–2 lists terminals in alphanumeric order by signal names.

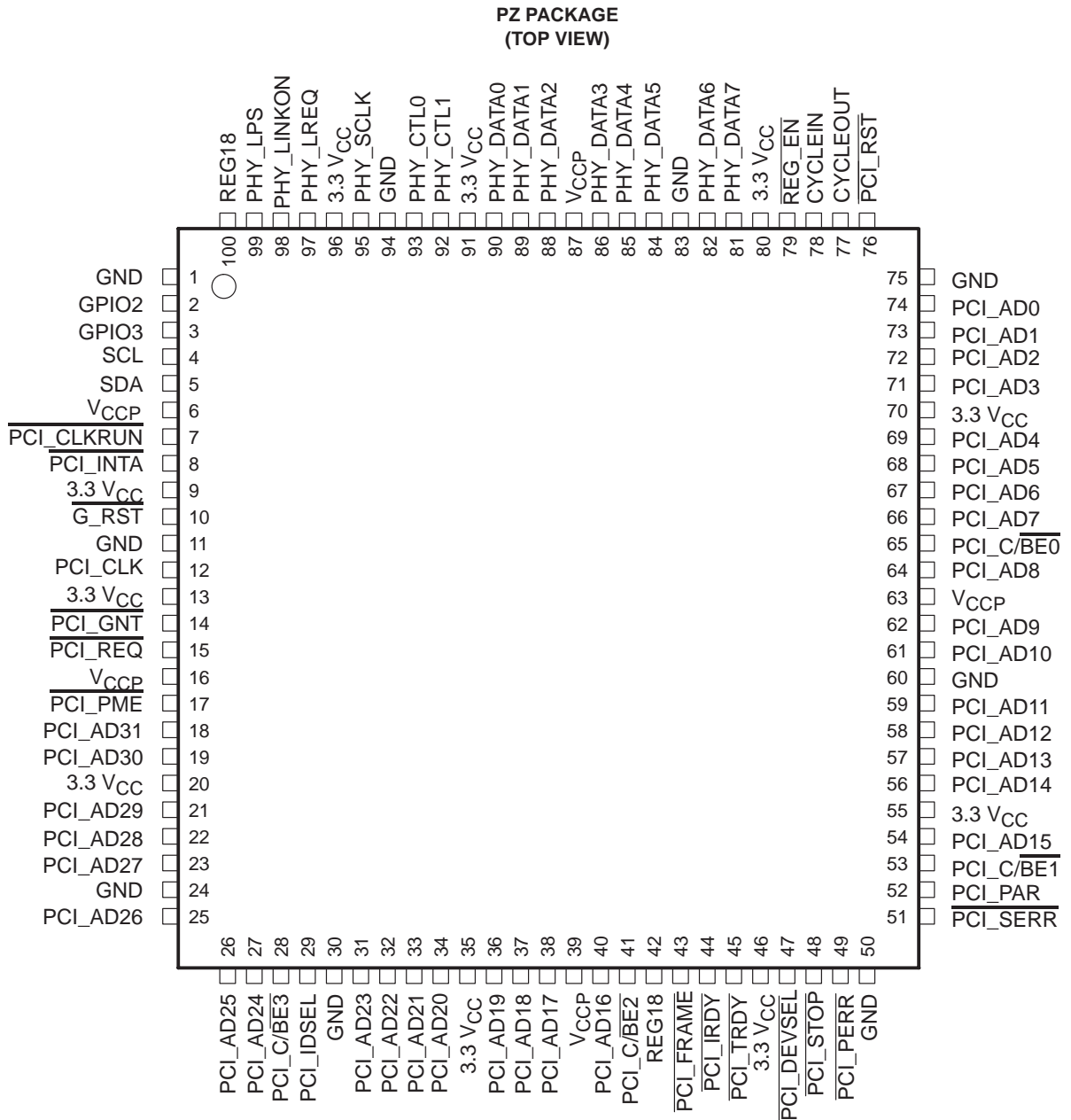


Figure 2–1. Terminal Assignments

Table 2–1. Signals Sorted by Terminal Number

| NO. | TERMINAL NAME | NO. | TERMINAL NAME | NO. | TERMINAL NAME | NO. | TERMINAL NAME |
|-----|---------------|-----|---------------|-----|---------------|-----|---------------|
| 1 | GND | 26 | PCI_AD25 | 51 | PCI_SERR | 76 | PCI_RST |
| 2 | GPIO2 | 27 | PCI_AD24 | 52 | PCI_PAR | 77 | CYCLEOUT |
| 3 | GPIO3 | 28 | PCI_C/BE3 | 53 | PCI_C/BE1 | 78 | CYCLEIN |
| 4 | SCL | 29 | PCI_IDSEL | 54 | PCI_AD15 | 79 | REG_EN |
| 5 | SDA | 30 | GND | 55 | 3.3 VCC | 80 | 3.3 VCC |
| 6 | VCCP | 31 | PCI_AD23 | 56 | PCI_AD14 | 81 | PHY_DATA7 |
| 7 | PCI_CLKRUN | 32 | PCI_AD22 | 57 | PCI_AD13 | 82 | PHY_DATA6 |
| 8 | PCI_INTA | 33 | PCI_AD21 | 58 | PCI_AD12 | 83 | GND |
| 9 | 3.3 VCC | 34 | PCI_AD20 | 59 | PCI_AD11 | 84 | PHY_DATA5 |
| 10 | G_RST | 35 | 3.3 VCC | 60 | GND | 85 | PHY_DATA4 |
| 11 | GND | 36 | PCI_AD19 | 61 | PCI_AD10 | 86 | PHY_DATA3 |
| 12 | PCI_CLK | 37 | PCI_AD18 | 62 | PCI_AD9 | 87 | VCCP |
| 13 | 3.3 VCC | 38 | PCI_AD17 | 63 | VCCP | 88 | PHY_DATA2 |
| 14 | PCI_GNT | 39 | VCCP | 64 | PCI_AD8 | 89 | PHY_DATA1 |
| 15 | PCI_REQ | 40 | PCI_AD16 | 65 | PCI_C/BE0 | 90 | PHY_DATA0 |
| 16 | VCCP | 41 | PCI_C/BE2 | 66 | PCI_AD7 | 91 | 3.3 VCC |
| 17 | PCI_PME | 42 | REG18 | 67 | PCI_AD6 | 92 | PHY_CTL1 |
| 18 | PCI_AD31 | 43 | PCI_FRAME | 68 | PCI_AD5 | 93 | PHY_CTL0 |
| 19 | PCI_AD30 | 44 | PCI_IRDY | 69 | PCI_AD4 | 94 | GND |
| 20 | 3.3 VCC | 45 | PCI_TRDY | 70 | 3.3 VCC | 95 | PHY_SCLK |
| 21 | PCI_AD29 | 46 | 3.3 VCC | 71 | PCI_AD3 | 96 | 3.3 VCC |
| 22 | PCI_AD28 | 47 | PCI_DEVSEL | 72 | PCI_AD2 | 97 | PHY_LREQ |
| 23 | PCI_AD27 | 48 | PCI_STOP | 73 | PCI_AD1 | 98 | PHY_LINKON |
| 24 | GND | 49 | PCI_PERR | 74 | PCI_AD0 | 99 | PHY_LPS |
| 25 | PCI_AD26 | 50 | GND | 75 | GND | 100 | REG18 |

Table 2–2. Signal Names Sorted Alphanumerically to Terminal Number

| TERMINAL NAME | NO. | TERMINAL NAME | NO. | TERMINAL NAME | NO. | TERMINAL NAME | NO. |
|----------------------------|-----|---------------|-----|---------------------------------|-----|-----------------------------|-----|
| CYCLEIN | 78 | PCI_AD11 | 59 | PCI_CLK | 12 | PHY_DATA7 | 81 |
| CYCLEOUT | 77 | PCI_AD12 | 58 | $\overline{\text{PCI_CLKRUN}}$ | 7 | PHY_LINKON | 98 |
| GND | 1 | PCI_AD13 | 57 | $\overline{\text{PCI_DEVSEL}}$ | 47 | PHY_LPS | 99 |
| GND | 11 | PCI_AD14 | 56 | $\overline{\text{PCI_FRAME}}$ | 43 | PHY_LREQ | 97 |
| GND | 24 | PCI_AD15 | 54 | $\overline{\text{PCI_GNT}}$ | 14 | PHY_SCLK | 95 |
| GND | 30 | PCI_AD16 | 40 | PCI_IDSEL | 29 | $\overline{\text{REG_EN}}$ | 79 |
| GND | 50 | PCI_AD17 | 38 | $\overline{\text{PCI_INTA}}$ | 8 | REG18 | 42 |
| GND | 60 | PCI_AD18 | 37 | $\overline{\text{PCI_IRDY}}$ | 44 | REG18 | 100 |
| GND | 75 | PCI_AD19 | 36 | PCI_PAR | 52 | SCL | 4 |
| GND | 83 | PCI_AD20 | 34 | $\overline{\text{PCI_PERR}}$ | 49 | SDA | 5 |
| GND | 94 | PCI_AD21 | 33 | $\overline{\text{PCI_PME}}$ | 17 | VCCP | 6 |
| GPIO2 | 2 | PCI_AD22 | 32 | $\overline{\text{PCI_REQ}}$ | 15 | VCCP | 16 |
| GPIO3 | 3 | PCI_AD23 | 31 | $\overline{\text{PCI_RST}}$ | 76 | VCCP | 39 |
| $\overline{\text{G_RST}}$ | 10 | PCI_AD24 | 27 | $\overline{\text{PCI_SERR}}$ | 51 | VCCP | 63 |
| PCI_AD0 | 74 | PCI_AD25 | 26 | $\overline{\text{PCI_STOP}}$ | 48 | VCCP | 87 |
| PCI_AD1 | 73 | PCI_AD26 | 25 | $\overline{\text{PCI_TRDY}}$ | 45 | 3.3 V _{CC} | 9 |
| PCI_AD2 | 72 | PCI_AD27 | 23 | PHY_CTL0 | 93 | 3.3 V _{CC} | 13 |
| PCI_AD3 | 71 | PCI_AD28 | 22 | PHY_CTL1 | 92 | 3.3 V _{CC} | 20 |
| PCI_AD4 | 69 | PCI_AD29 | 21 | PHY_DATA0 | 90 | 3.3 V _{CC} | 35 |
| PCI_AD5 | 68 | PCI_AD30 | 19 | PHY_DATA1 | 89 | 3.3 V _{CC} | 46 |
| PCI_AD6 | 67 | PCI_AD31 | 18 | PHY_DATA2 | 88 | 3.3 V _{CC} | 55 |
| PCI_AD7 | 66 | PCI_C/BE0 | 65 | PHY_DATA3 | 86 | 3.3 V _{CC} | 70 |
| PCI_AD8 | 64 | PCI_C/BE1 | 53 | PHY_DATA4 | 85 | 3.3 V _{CC} | 80 |
| PCI_AD9 | 62 | PCI_C/BE2 | 41 | PHY_DATA5 | 84 | 3.3 V _{CC} | 91 |
| PCI_AD10 | 61 | PCI_C/BE3 | 28 | PHY_DATA6 | 82 | 3.3 V _{CC} | 96 |

The terminals in Table 2–3 through Table 2–8 are grouped in tables by functionality, such as PCI system function and power supply function. The terminal numbers are also listed for convenient reference.

Table 2–3. Power Supply Terminals

| TERMINAL | | I/O | DESCRIPTION |
|---------------------|---------------------------------------|-----|---|
| NAME | NO. | | |
| GND | 1, 11, 24, 30, 50, 60, 75, 83, 94 | I | Device ground terminals |
| VCCP | 6, 16, 39, 63, 87 | I | PCI signaling clamp voltage power input. PCI signals are clamped per the <i>PCI Local Bus Specification</i> . |
| 3.3 V _{CC} | 9, 13, 20, 35, 46, 55, 70, 80, 91, 96 | I | 3.3-V power supply terminals |

Table 2–4. PCI System Terminals

| TERMINAL | | I/O | DESCRIPTION |
|------------------------|-----|-----|--|
| NAME | NO. | | |
| $\overline{G_RST}$ | 10 | I | Global power reset. This reset brings all of the TSB12LV26 internal registers to their default states, including those registers not reset by $\overline{PCI_RST}$. When $\overline{G_RST}$ is asserted, the device is completely nonfunctional. When implementing wake capabilities from the 1394 host controller, it is necessary to implement two resets to the TSB12LV26 device. $\overline{G_RST}$ is designed to be a one-time power-on reset, and $\overline{PCI_RST}$ must be connected to the PCI bus \overline{RST} . If wake capabilities are not required, $\overline{G_RST}$ can be connected to the PCI bus \overline{RST} (see $\overline{PCI_RST}$, terminal 76). |
| PCI_CLK | 12 | I | PCI bus clock. Provides timing for all transactions on the PCI bus. All PCI signals are sampled at rising edge of PCI_CLK. |
| $\overline{PCI_INTA}$ | 8 | O | Interrupt signal. This output indicates interrupts from the TSB12LV26 device to the host. This terminal is implemented as open-drain. |
| $\overline{PCI_RST}$ | 76 | I | PCI reset. When this bus reset is asserted, the TSB12LV26 device places all output buffers in a high-impedance state and resets all internal registers except device power management context- and vendor-specific bits initialized by host power-on software. When $\overline{PCI_RST}$ is asserted, the device is completely nonfunctional. If this terminal is implemented, it must be connected to the PCI bus \overline{RST} signal. Otherwise, it must be pulled high to link V_{CC} through a 4.7-k Ω resistor, or strapped to the $\overline{G_RST}$ terminal (see $\overline{G_RST}$, terminal 10). |

Table 2–5. PCI Address and Data Terminals

| TERMINAL | | I/O | DESCRIPTION |
|----------|-----|-----|---|
| NAME | NO. | | |
| PCI_AD31 | 18 | I/O | PCI address/data bus. These signals make up the multiplexed PCI address and data bus on the PCI interface. During the address phase of a PCI cycle, AD31–AD0 contain a 32-bit address or other destination information. During the data phase, AD31–AD0 contain data. |
| PCI_AD30 | 19 | | |
| PCI_AD29 | 21 | | |
| PCI_AD28 | 22 | | |
| PCI_AD27 | 23 | | |
| PCI_AD26 | 25 | | |
| PCI_AD25 | 26 | | |
| PCI_AD24 | 27 | | |
| PCI_AD23 | 31 | | |
| PCI_AD22 | 32 | | |
| PCI_AD21 | 33 | | |
| PCI_AD20 | 34 | | |
| PCI_AD19 | 36 | | |
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| PCI_AD14 | 56 | | |
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| PCI_AD12 | 58 | | |
| PCI_AD11 | 59 | | |
| PCI_AD10 | 61 | | |
| PCI_AD9 | 62 | | |
| PCI_AD8 | 64 | | |
| PCI_AD7 | 66 | | |
| PCI_AD6 | 67 | | |
| PCI_AD5 | 68 | | |
| PCI_AD4 | 69 | | |
| PCI_AD3 | 71 | | |
| PCI_AD2 | 72 | | |
| PCI_AD1 | 73 | | |
| PCI_AD0 | 74 | | |

Table 2–6. PCI Interface Control Terminals

| TERMINAL | | I/O | DESCRIPTION |
|--|----------------------|-----|---|
| NAME | NO. | | |
| PCI_C/BE0 PCI_C/BE1 PCI_C/BE2 PCI_C/BE3 | 65 53 41 28 | I/O | PCI bus commands and byte enables. The command and byte enable signals are multiplexed on the same PCI terminals. During the address phase of a bus cycle PCI_C/BE3–PCI_C/BE0 define the bus command. During the data phase, this 4-bit bus is used as byte enables. |
| PCI_CLKRUN | 7 | I/O | Clock run. This terminal provides clock control through the PCI_CLKRUN protocol. An internal pulldown resistor is implemented on this terminal. This terminal is implemented as open-drain. |
| PCI_DEVSEL | 47 | I/O | PCI device select. The TSB12LV26 device asserts this signal to claim a PCI cycle as the target device. As a PCI initiator, the TSB12LV26 device monitors this signal until a target responds. If no target responds before time-out occurs, the TSB12LV26 device terminates the cycle with an initiator abort. |
| PCI_FRAME | 43 | I/O | PCI cycle frame. This signal is driven by the initiator of a PCI bus cycle. PCI_FRAME is asserted to indicate that a bus transaction is beginning, and data transfers continue while this signal is asserted. When PCI_FRAME is deasserted, the PCI bus transaction is in the final data phase. |
| PCI_GNT | 14 | I | PCI bus grant. This signal is driven by the PCI bus arbiter to grant the TSB12LV26 device access to the PCI bus after the current data transaction has completed. This signal may or may not follow a PCI bus request, depending upon the PCI bus parking algorithm. |
| PCI_IDSEL | 29 | I | Initialization device select. PCI_IDSEL selects the TSB12LV26 device during configuration space accesses. PCI_IDSEL can be connected to one of the upper 24 PCI address lines on the PCI bus. |
| PCI_IRDY | 44 | I/O | PCI initiator ready. PCI_IRDY indicates the ability of the PCI bus initiator to complete the current data phase of the transaction. A data phase is completed upon a rising edge of PCLK where both PCI_IRDY and PCI_TRDY are asserted. |
| PCI_PAR | 52 | I/O | PCI parity. In all PCI bus read and write cycles, the TSB12LV26 device calculates even parity across the PCI_AD and PCI_C/BE buses. As an initiator during PCI cycles, the TSB12LV26 device outputs this parity indicator with a one PCI_CLK delay. As a target during PCI cycles, the calculated parity is compared to the initiator parity indicator; a miscompare can result in a parity error assertion (PCI_PERR). |
| PCI_PERR | 49 | I/O | PCI parity error indicator. This signal is driven by a PCI device to indicate that calculated parity does not match PCI_PAR when PERR_ENB (bit 6) in the command register at offset 04h in the PCI configuration space (see Section 3.4, <i>Command Register</i>) is set to 1. |
| PCI_PME | 17 | O | Power management event. This terminal indicates wake events to the host. |
| PCI_REQ | 15 | O | PCI bus request. Asserted by the TSB12LV26 device to request access to the bus as an initiator. The host arbiter asserts the PCI_GNT signal when the TSB12LV26 device has been granted access to the bus. |
| PCI_SERR | 51 | O | PCI system error. When SERR_ENB (bit 8) in the command register at offset 04h in the PCI configuration space (see Section 3.4, <i>Command Register</i>) is set to 1, the output is pulsed, indicating an address parity error has occurred. The TSB12LV26 device need not be the target of the PCI cycle to assert this signal. This terminal is implemented as open-drain. |
| PCI_STOP | 48 | I/O | PCI cycle stop signal. This signal is driven by a PCI target to request the initiator to stop the current PCI bus transaction. This signal is used for target disconnects, and is commonly asserted by target devices which do not support burst data transfers. |
| PCI_TRDY | 45 | I/O | PCI target ready. PCI_TRDY indicates the ability of the PCI bus target to complete the current data phase of the transaction. A data phase is completed upon a rising edge of PCI_CLK where both PCI_IRDY and PCI_TRDY are asserted. |

Table 2–7. IEEE 1394 PHY/Link Terminals

| TERMINAL | | I/O | DESCRIPTION |
|--|--|-----|---|
| NAME | NO. | | |
| PHY_CTL1 PHY_CTL0 | 92 93 | I/O | PHY-link interface control. These bidirectional signals control passage of information between the two devices. The TSB12LV26 device can only drive these terminals after the PHY device has granted permission following a link request (PHY_LREQ). |
| PHY_DATA7 PHY_DATA6 PHY_DATA5 PHY_DATA4 PHY_DATA3 PHY_DATA2 PHY_DATA1 PHY_DATA0 | 81 82 84 85 86 88 89 90 | I/O | PHY-link interface data. These bidirectional signals pass data between the TSB12LV26 and the PHY devices. These terminals are driven by the TSB12LV26 device on transmissions and are driven by the PHY device on receptions. Only PHY_DATA1–PHY_DATA0 are valid for 100M-bit speeds, PHY_DATA3–PHY_DATA0 are valid for 200M-bit speeds, and PHY_DATA7–PHY_DATA0 are valid for 400M-bit speeds. |
| PHY_LINKON | 98 | I/O | LinkOn wake indication. The PHY_LINKON signal is pulsed by the PHY device to activate the link, and 3.3-V signaling is required. When connected to the TSB41LV0X C/LKON terminal, a 1-k Ω series resistor is required between the link and PHY device. |
| PHY_LPS | 99 | I/O | Link power status. The PHY_LPS signal is asserted when the link is powered on, and 3.3-V signaling is required. |
| PHY_LREQ | 97 | O | Link request. This signal is driven by the TSB12LV26 device to initiate a request for the PHY device to perform some service. |
| PHY_SCLK | 95 | I | System clock. This input from the PHY device provides a 49.152-MHz clock signal for data synchronization. |

Table 2–8. Miscellaneous Terminals

| TERMINAL | | I/O | DESCRIPTION |
|-----------------------------|-----------|-----|--|
| NAME | NO. | | |
| CYCLEIN | 78 | I/O | The CYCLEIN terminal allows an external 8-kHz clock to be used as a cycle timer for synchronization with other system devices. If this terminal is not implemented, it must be pulled high to the link V_{CC} through a 4.7-k Ω resistor. |
| CYCLEOUT | 77 | I/O | This terminal provides an 8-kHz cycle timer synchronization signal. |
| GPIO2 | 2 | I/O | General-purpose I/O [2]. This terminal defaults as an input and if it is not implemented, it is recommended that it be pulled low to ground with a 220- Ω resistor. |
| GPIO3 | 3 | I/O | General-purpose I/O [3]. This terminal defaults as an input and if it is not implemented, it is recommended that it be pulled low to ground with a 220- Ω resistor. |
| $\overline{\text{REG_EN}}$ | 79 | I | Regulator enable. This terminal is pulled low to ground through a 220- Ω resistor. |
| REG18 | 42 100 | I | The REG18 terminals are connected to a 0.01 μF capacitor which, in turn, is connected to ground. The capacitor provides a local bypass for the internal core voltage. |
| SCL | 4 | I/O | Serial clock. The TSB12LV26 device determines whether a two-wire serial ROM or no serial ROM is implemented at reset. If a two-wire serial ROM is implemented, this terminal provides the SCL serial clock signaling. This terminal is implemented as open-drain, and for normal operation (a ROM is implemented in the design), this terminal must be pulled high to the ROM V_{CC} with a 2.7-k Ω resistor. Otherwise, it must be pulled low to ground with a 220- Ω resistor. |
| SDA | 5 | I/O | Serial data. The TSB12LV26 device determines whether a two-wire serial ROM or no serial ROM is implemented at reset. If a two-wire serial ROM is detected, this terminal provides the SDA serial data signaling. This terminal must be wired low to indicate no serial ROM is present. This terminal is implemented as open-drain, and for normal operation (a ROM is implemented in the design), this terminal must be pulled high to the ROM V_{CC} with a 2.7-k Ω resistor. Otherwise, it must be pulled low to ground with a 220- Ω resistor. |

3 TSB12LV26 Controller Programming Model

This section describes the internal registers used to program the TSB12LV26 device. All registers are detailed in the same format: a brief description for each register is followed by the register offset and a bit table describing the reset state for each register.

A bit description table, typically included when the register contains bits of more than one type or purpose, indicates bit field names, field access tags which appear in the *type* column, and a detailed field description. Table 3–1 describes the field access tags.

Table 3–1. Bit Field Access Tag Descriptions

| ACCESS TAG | NAME | MEANING |
|------------|--------|---|
| R | Read | Field can be read by software. |
| W | Write | Field can be written by software to any value. |
| S | Set | Field can be set by a write of 1. Writes of 0 have no effect. |
| C | Clear | Field can be cleared by a write of 1. Writes of 0 have no effect. |
| U | Update | Field can be autonomously updated by the TSB12LV26 device. |

Figure 3–1 shows a simplified block diagram of the TSB12LV26 device.

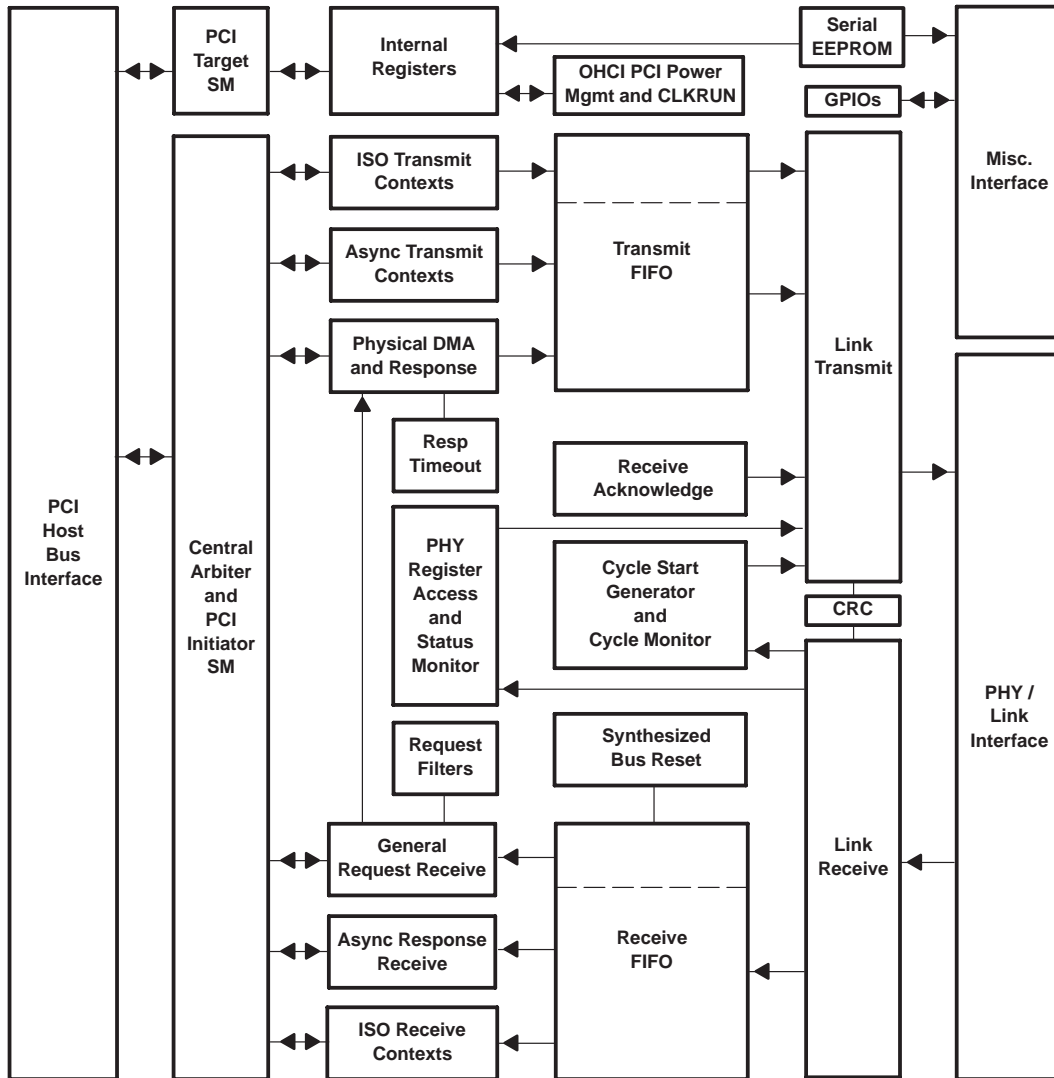


Figure 3-1. TSB12LV26 Block Diagram

3.1 PCI Configuration Registers

The TSB12LV26 device is a single-function PCI device. The configuration header is compliant with the *PCI Local Bus Specification* as a standard header. Table 3–2 illustrates the PCI configuration header that includes both the predefined portion of the configuration space and the user-definable registers.

Table 3–2. PCI Configuration Register Map

| REGISTER NAME | | | | OFFSET |
|--------------------------------------|---------------|---------------------------|---------------------------------------|---------|
| Device ID | | Vendor ID | | 00h |
| Status | | Command | | 04h |
| Class code | | | Revision ID | 08h |
| BIST | Header type | Latency timer | Cache line size | 0Ch |
| OHCI registers base address | | | | 10h |
| TI extension registers base address | | | | 14h |
| Reserved | | | | 18h |
| Reserved | | | | 1Ch |
| Reserved | | | | 20h |
| Reserved | | | | 24h |
| Reserved | | | | 28h |
| Subsystem ID | | Subsystem vendor ID | | 2Ch |
| Reserved | | | | 30h |
| Reserved | | | Power management capabilities pointer | 34h |
| Reserved | | | | 38h |
| Maximum latency | Minimum grant | Interrupt pin | Interrupt line | 3Ch |
| OHCI control register | | | | 40h |
| Power management capabilities | | Next item pointer | Capability ID | 44h |
| PM data | PMCSR_BSE | Power management CSR | | 48h |
| Reserved | | | | 4Ch–ECh |
| Miscellaneous configuration register | | | | F0h |
| Link_Enhancements register | | | | F4h |
| Subsystem ID alias | | Subsystem vendor ID alias | | F8h |
| GPIO3 | GPIO2 | Reserved | | FCh |

3.2 Vendor ID Register

The vendor ID register contains a value allocated by the PCI SIG and identifies the manufacturer of the PCI device. The vendor ID assigned to Texas Instruments is 104Ch.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|-----------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Name | Vendor ID | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |

Register: **Vendor ID**
 Type: Read-only
 Offset: 00h
 Default: 104Ch

3.3 Device ID Register

The device ID register contains a value assigned to the TSB12LV26 device by Texas Instruments. The device identification for the TSB12LV26 device is 8020h.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|-----------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Name | Device ID | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |

Register: **Device ID**
 Type: Read-only
 Offset: 02h
 Default: 8020h

3.4 Command Register

The command register provides control over the TSB12LV26 interface to the PCI bus. All bit functions adhere to the definitions in the *PCI Local Bus Specification*, as seen in the following bit descriptions. See Table 3–3 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|---------|----|----|----|----|----|---|-----|---|-----|---|-----|---|-----|-----|---|
| Name | Command | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R/W | R | R/W | R | R/W | R | R/W | R/W | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Command**
 Type: Read/Write, Read-only
 Offset: 04h
 Default: 0000h

Table 3–3. Command Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|--|
| 15–10 | RSVD | R | Reserved. Bits 15–10 return 0s when read. |
| 9 | FBB_ENB | R | Fast back-to-back enable. The TSB12LV26 device does not generate fast back-to-back transactions; therefore, bit 9 returns 0 when read. |
| 8 | SERR_ENB | R/W | $\overline{\text{PCI_SERR}}$ enable. When bit 8 is set to 1, the TSB12LV26 $\overline{\text{PCI_SERR}}$ driver is enabled. $\overline{\text{PCI_SERR}}$ can be asserted after detecting an address parity error on the PCI bus. |
| 7 | STEP_ENB | R | Address/data stepping control. The TSB12LV26 device does not support address/data stepping; therefore, bit 7 is hardwired to 0. |
| 6 | PERR_ENB | R/W | Parity error enable. When bit 6 is set to 1, the TSB12LV26 device is enabled to drive $\overline{\text{PCI_PERR}}$ response to parity errors through the $\overline{\text{PCI_PERR}}$ signal. |
| 5 | VGA_ENB | R | VGA palette snoop enable. The TSB12LV26 device does not feature VGA palette snooping; therefore, bit 5 returns 0 when read. |
| 4 | MWI_ENB | R/W | Memory write and invalidate enable. When bit 4 is set to 1, the TSB12LV26 device is enabled to generate MWI PCI bus commands. If this bit is cleared, the TSB12LV26 device generates memory write commands instead. |
| 3 | SPECIAL | R | Special cycle enable. The TSB12LV26 function does not respond to special cycle transactions; therefore, bit 3 returns 0 when read. |
| 2 | MASTER_ENB | R/W | Bus master enable. When bit 2 is set to 1, the TSB12LV26 device is enabled to initiate cycles on the PCI bus. |
| 1 | MEMORY_ENB | R/W | Memory response enable. Setting bit 1 to 1 enables the TSB12LV26 device to respond to memory cycles on the PCI bus. This bit must be set to access OHCI registers. |
| 0 | IO_ENB | R | I/O space enable. The TSB12LV26 device does not implement any I/O-mapped functionality; therefore, bit 0 returns 0 when read. |

3.5 Status Register

The status register provides status over the TSB12LV26 interface to the PCI bus. All bit functions adhere to the definitions in the *PCI Local Bus Specification*, as seen in the following bit descriptions. See Table 3–4 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|--------|-----|-----|-----|-----|----|---|-----|---|---|---|---|---|---|---|---|
| Name | Status | | | | | | | | | | | | | | | |
| Type | RCU | RCU | RCU | RCU | RCU | R | R | RCU | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

Register: **Status**
 Type: Read/Clear/Update, Read-only
 Offset: 06h
 Default: 0210h

Table 3–4. Status Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 15 | PAR_ERR | RCU | Detected parity error. Bit 15 is set to 1 when either an address parity or data parity error is detected. |
| 14 | SYS_ERR | RCU | Signaled system error. Bit 14 is set to 1 when $\overline{\text{PCI_SERR}}$ is enabled and the TSB12LV26 device has signaled a system error to the host. |
| 13 | MABORT | RCU | Received master abort. Bit 13 is set to 1 when a cycle initiated by the TSB12LV26 device on the PCI bus has been terminated by a master abort. |
| 12 | TABORT_REC | RCU | Received target abort. Bit 12 is set to 1 when a cycle initiated by the TSB12LV26 device on the PCI bus was terminated by a target abort. |
| 11 | TABORT_SIG | RCU | Signaled target abort. Bit 11 is set to 1 by the TSB12LV26 device when it terminates a transaction on the PCI bus with a target abort. |
| 10–9 | PCI_SPEED | R | DEVSEL timing. Bits 10 and 9 encode the timing of $\overline{\text{PCI_DEVSEL}}$ and are hardwired to 01b, indicating that the TSB12LV26 device asserts this signal at a medium speed on nonconfiguration cycle accesses. |
| 8 | DATAPAR | RCU | Data parity error detected. Bit 8 is set to 1 when the following conditions have been met: a. $\overline{\text{PCI_PERR}}$ was asserted by any PCI device including the TSB12LV26 device. b. The TSB12LV26 device was the bus master during the data parity error. c. Bit 6 (PERR_ENB) in the command register at offset 04h in the PCI configuration space (see Section 3.4, <i>Command Register</i>) is set to 1. |
| 7 | FBB_CAP | R | Fast back-to-back capable. The TSB12LV26 device cannot accept fast back-to-back transactions; therefore, bit 7 is hardwired to 0. |
| 6 | UDF | R | User-definable features (UDF) supported. The TSB12LV26 device does not support the UDF; therefore, bit 6 is hardwired to 0. |
| 5 | 66MHZ | R | 66-MHz capable. The TSB12LV26 device operates at a maximum PCI_CLK frequency of 33 MHz; therefore, bit 5 is hardwired to 0. |
| 4 | CAPLIST | R | Capabilities list. Bit 4 returns 1 when read, indicating that capabilities additional to standard PCI are implemented. The linked list of PCI power-management capabilities is implemented in this function. |
| 3–0 | RSVD | R | Reserved. Bits 3–0 return 0s when read. |

3.6 Class Code and Revision ID Register

The class code and revision ID register categorizes the TSB12LV26 device as a serial bus controller (0Ch), controlling an IEEE 1394 bus (00h), with an OHCI programming model (10h). Furthermore, the TI chip revision is indicated in the least significant byte. See Table 3–5 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | Class code and revision ID | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Class code and revision ID | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Class code and revision ID**
 Type: Read-only
 Offset: 08h
 Default: 0C00 1000h

Table 3–5. Class Code and Revision ID Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|---|
| 31–24 | BASECLASS | R | Base class. This field returns 0Ch when read, which broadly classifies the function as a serial bus controller. |
| 23–16 | SUBCLASS | R | Subclass. This field returns 00h when read, which specifically classifies the function as controlling an IEEE 1394 serial bus. |
| 15–8 | PGMIF | R | Programming interface. This field returns 10h when read, indicating that the programming model is compliant with the <i>1394 Open Host Controller Interface Specification</i> . |
| 7–0 | CHIPREV | R | Silicon revision. This field returns 00h when read, indicating the silicon revision of the TSB12LV26 device. |

3.7 Latency Timer and Class Cache Line Size Register

The latency timer and class cache line size register is programmed by host BIOS to indicate system cache line size and the latency timer associated with the TSB12LV26 device. See Table 3–6 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Latency timer and class cache line size | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Latency timer and class cache line size**
 Type: Read/Write
 Offset: 0Ch
 Default: 0000h

Table 3–6. Latency Timer and Class Cache Line Size Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|---------------|------|--|
| 15–8 | LATENCY_TIMER | R/W | PCI latency timer. The value in this register specifies the latency timer for the TSB12LV26 device, in units of PCI clock cycles. When the TSB12LV26 device is a PCI bus initiator and asserts <code>PCI_FRAME</code> , the latency timer begins counting from zero. If the latency timer expires before the <code>TSB12LV26</code> transaction has terminated, the TSB12LV26 device terminates the transaction when its <code>PCI_GNT</code> is deasserted. |
| 7–0 | CACHELINE_SZ | R/W | Cache line size. This value is used by the TSB12LV26 device during memory write and invalidate, memory-read line, and memory-read multiple transactions. |

3.8 Header Type and BIST Register

The header type and built-in self-test (BIST) register indicates the TSB12LV26 PCI header type and no built-in self-test. See Table 3–7 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------------|----------------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Name | Header type and BIST | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Header type and BIST**
 Type: Read-only
 Offset: 0Eh
 Default: 0000h

Table 3–7. Header Type and BIST Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|-------------|------|---|
| 15–8 | BIST | R | Built-in self-test. The TSB12LV26 device does not include a BIST; therefore, this field returns 00h when read. |
| 7–0 | HEADER_TYPE | R | PCI header type. The TSB12LV26 device includes the standard PCI header, which is communicated by returning 00h when this field is read. |

3.9 OHCI Base Address Register

The OHCI base address register is programmed with a base address referencing the memory-mapped OHCI control. When BIOS writes all 1s to this register, the value read back is FFFF F800h, indicating that at least 2K bytes of memory address space are required for the OHCI registers. See Table 3–8 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | OHCI base address | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | OHCI address | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **OHCI base address**
 Type: Read/Write, Read-only
 Offset: 10h
 Default: 0000 0000h

Table 3–8. OHCI Base Address Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|--------------|------|--|
| 31–11 | OHCIREG_PTR | R/W | OHCI register pointer. Specifies the upper 21 bits of the 32-bit OHCI base address register. |
| 10–4 | OHCI_SZ | R | OHCI register size. This field returns 0s when read, indicating that the OHCI registers require a 2K-byte region of memory. |
| 3 | OHCI_PF | R | OHCI register prefetch. This bit returns 0 when read, indicating that the OHCI registers are nonprefetchable. |
| 2–1 | OHCI_MEMTYPE | R | OHCI memory type. This field returns 0s when read, indicating that the OHCI base address register is 32 bits wide and mapping can be done anywhere in the 32-bit memory space. |
| 0 | OHCI_MEM | R | OHCI memory indicator. Bit 0 returns 0 when read, indicating that the OHCI registers are mapped into system memory space. |

3.10 TI Extension Base Address Register

The TI extension base address register is programmed with a base address referencing the memory-mapped TI extension registers. See Section 3.9, *OHCI Base Address Register* for bit field details.

| | | | | | | | | | | | | | | | | |
|----------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | TI extension base address | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | TI extension base address | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **TI extension base address**
 Type: Read/Write, Read-only
 Offset: 14h
 Default: 0000 0000h

3.11 Subsystem Identification Register

The subsystem identification register is used for system and option card identification purposes. This register can be initialized from the serial EEPROM or programmed via the subsystem access register at offset F8h in PCI configuration space (see Section 3.22, *Subsystem Access Register*). See Table 3–9 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Subsystem identification | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Subsystem identification | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Subsystem identification**
 Type: Read/Update
 Offset: 2Ch
 Default: 0000 0000h

Table 3–9. Subsystem Identification Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|--|
| 31–16 | OHCI_SSID | RU | Subsystem device ID. This field indicates the subsystem device ID. |
| 15–0 | OHCI_SSVID | RU | Subsystem vendor ID. This field indicates the subsystem vendor ID. |

3.12 Power Management Capabilities Pointer Register

The power management capabilities pointer register provides a pointer into the PCI configuration header where the PCI power-management register block resides. The TSB12LV26 configuration header doublewords at offsets 44h and 48h provide the power-management registers. This register is read-only and returns 44h when read.

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|---------------------------------------|---|---|---|---|---|---|---|
| Name | Power management capabilities pointer | | | | | | | |
| Type | R | R | R | R | R | R | R | R |
| Default | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |

Register: **Power management capabilities pointer**
 Type: Read-only
 Offset: 34h
 Default: 44h

3.13 Interrupt Line and Pin Register

The interrupt line and pin register communicates interrupt line routing information. See Table 3–10 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|------------------------|----|----|----|----|----|---|---|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Interrupt line and pin | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Interrupt line and pin**
 Type: Read/Write, Read-only
 Offset: 3Ch
 Default: 0100h

Table 3–10. Interrupt Line and Pin Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|---|
| 15–8 | INTR_PIN | R | Interrupt pin. This field returns 01h when read, indicating that the TSB12LV26 PCI function signals interrupts on the PCI_INTA terminal. |
| 7–0 | INTR_LINE | R/W | Interrupt line. This field is programmed by the system and indicates to software which interrupt line the TSB12LV26 PCI_INTA is connected to. |

3.14 MIN_GNT and MAX_LAT Register

The MIN_GNT and MAX_LAT register communicates to the system the desired setting of bits 15–8 in the latency timer and class cache line size register at offset 0Ch in PCI configuration space (see Section 3.7, *Latency Timer and Class Cache Line Size Register*). If a serial EEPROM is detected, the contents of this register are loaded through the serial EEPROM interface after a PCI_RST. If no serial EEPROM is detected, this register returns a default value that corresponds to the MIN_GNT = 2, MAX_LAT = 4. See Table 3–11 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|---------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | MIN_GNT and MAX_LAT | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

Register: **MIN_GNT and MAX_LAT**
 Type: Read/Update
 Offset: 3Eh
 Default: 0402h

Table 3–11. MIN_GNT and MAX_LAT Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 15–8 | MAX_LAT | RU | Maximum latency. The contents of this field may be used by host BIOS to assign an arbitration priority level to the TSB12LV26 device. The default for this register indicates that the TSB12LV26 device may need to access the PCI bus as often as every 0.25 μs; thus, an extremely high priority level is requested. The contents of this field may also be loaded through the serial EEPROM. |
| 7–0 | MIN_GNT | RU | Minimum grant. The contents of this field may be used by host BIOS to assign a latency timer register value to the TSB12LV26 device. The default for this register indicates that the TSB12LV26 device may need to sustain burst transfers for nearly 64 μs; thus, requesting a large value be programmed in bits 15–8 of the TSB12LV26 latency timer and class cache line size register at offset 0Ch in PCI configuration space (see Section 3.7, <i>Latency Timer and Class Cache Line Size Register</i>). |

3.15 OHCI Control Register

The OHCI control register is defined by the *1394 Open Host Controller Interface Specification* and provides a bit for big endian PCI support. See Table 3–12 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| Name | OHCI control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | OHCI control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **OHCI control**
 Type: Read/Write, Read-only
 Offset: 40h
 Default: 0000 0000h

Table 3–12. OHCI Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|-------------|------|--|
| 31–1 | RSVD | R | Reserved. Bits 31–1 return 0s when read. |
| 0 | GLOBAL_SWAP | R/W | When bit 0 is set to 1, all quadlets read from and written to the PCI interface are byte-swapped (big endian). This bit is loaded from serial EEPROM and must be cleared to 0 for normal IBM-compatible operation. |

3.16 Capability ID and Next Item Pointer Register

The capability ID and next item pointer register identifies the linked-list capability item and provides a pointer to the next capability item. See Table 3–13 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|-------------------------------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Name | Capability ID and next item pointer | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Register: **Capability ID and next item pointer**
 Type: Read-only
 Offset: 44h
 Default: 0001h

Table 3–13. Capability ID and Next Item Pointer Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|---------------|------|---|
| 15–8 | NEXT_ITEM | R | Next item pointer. The TSB12LV26 device supports only one additional capability that is communicated to the system through the extended capabilities list; therefore, this field returns 00h when read. |
| 7–0 | CAPABILITY_ID | R | Capability identification. This field returns 01h when read, which is the unique ID assigned by the PCI SIG for PCI power-management capability. |

3.17 Power Management Capabilities Register

The power management capabilities register indicates the capabilities of the TSB12LV26 device related to PCI power management. See Table 3–14 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|-------------------------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Name | Power management capabilities | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Register: **Power management capabilities**
 Type: Read/Update, Read-only
 Offset: 46h
 Default: 6401h

Table 3–14. Power Management Capabilities Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|-------------|------|---|
| 15 | PME_D3COLD | RU | PCI_PME support from D3 _{cold} . This bit can be set to 1 or cleared to 0 via bit 15 (PME_D3COLD) in the miscellaneous configuration register at offset F0h in the PCI configuration space (see Section 3.20, <i>Miscellaneous Configuration Register</i>). The miscellaneous configuration register is loaded from ROM. When this bit is set to 1, it indicates that the TSB12LV26 device is capable of generating a PCI_PME wake event from D3 _{cold} . This bit state is dependent upon the TSB12LV26 V _{AUX} implementation and may be configured by using bit 15 (PME_D3COLD) in the miscellaneous configuration register. |
| 14–11 | PME_SUPPORT | RU | PCI_PME support. This 4-bit field indicates the power states from which the TSB12LV26 device may assert PCI_PME. This field returns a value of 1100b by default, indicating that PCI_PME may be asserted from the D3 _{hot} and D2 power states. Bit 13 may be modified by host software using bit 13 (PME_SUPPORT_D2) in the miscellaneous configuration register at offset F0h in the PCI configuration space (see Section 3.20, <i>Miscellaneous Configuration Register</i>). |
| 10 | D2_SUPPORT | RU | D2 support. This bit can be set or cleared via bit 10 (D2_SUPPORT) in the miscellaneous configuration register at offset F0h in the PCI configuration space (see Section 3.20, <i>Miscellaneous Configuration Register</i>). The miscellaneous configuration register is loaded from serial EEPROM. When this bit is set to 1, it indicates that D2 support is present. When this bit is cleared, it indicates that D2 support is not present for backward compatibility with the TSB12LV22 device. For normal operation, this bit is set to 1. |
| 9 | D1_SUPPORT | R | D1 support. Bit 9 returns a 0 when read, indicating that the TSB12LV26 device does not support the D1 power state. |
| 8 | DYN_DATA | R | Dynamic data support. Bit 8 returns a 0 when read, indicating that the TSB12LV26 device does not report dynamic power-consumption data. |
| 7–6 | RSVD | R | Reserved. Bits 7 and 6 return 0s when read. |
| 5 | DSI | R | Device-specific initialization. Bit 5 returns 0 when read, indicating that the TSB12LV26 device does not require special initialization beyond the standard PCI configuration header before a generic class driver is able to use it. |
| 4 | AUX_PWR | R | Auxiliary power source. Since the TSB12LV26 device does not support PCI_PME generation in the D3 _{cold} device state, bit 4 returns 0 when read. |
| 3 | PME_CLK | R | PME clock. Bit 3 returns 0 when read, indicating that no host bus clock is required for the TSB12LV26 device to generate PCI_PME. |
| 2–0 | PM_VERSION | R | Power-management version. This field returns 001b when read, indicating that the TSB12LV26 device is compatible with the registers described in the <i>PCI Bus Power Management Interface Specification</i> (Revision 1.0). |

3.18 Power Management Control and Status Register

The power management control and status register implements the control and status of the PCI power management function. This register is not affected by the internally generated reset caused by the transition from the D3_{hot} to D0 state. See Table 3–15 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------------|-------------------------------------|----|----|----|----|----|---|-----|---|---|---|---|---|---|-----|-----|
| Name | Power management control and status | | | | | | | | | | | | | | | |
| Type | RC | R | R | R | R | R | R | R/W | R | R | R | R | R | R | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Power management control and status**
 Type: Read/Clear, Read/Write, Read-only
 Offset: 48h
 Default: 0000h

Table 3–15. Power Management Control and Status Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 15 | PME_STS | RC | Bit 15 is set to 1 when the TSB12LV26 device normally asserts the <u>PCI_PME</u> signal, independent of the state of bit 8 (PME_ENB). This bit is cleared by a writeback of 1, which also clears the <u>PCI_PME</u> signal driven by the TSB12LV26 device. Writing a 0 to this bit has no effect. |
| 14–9 | DYN_CTRL | R | Dynamic data control. This field returns 0s when read since the TSB12LV26 device does not report dynamic data. |
| 8 | PME_ENB | R/W | When bit 8 is set to 1, <u>PCI_PME</u> assertion is enabled. When bit 8 is cleared, <u>PCI_PME</u> assertion is disabled. This bit defaults to 0 if the function does not support <u>PCI_PME</u> generation from D3 _{cold} . If the function supports <u>PCI_PME</u> from D3 _{cold} , this bit is sticky and must be explicitly cleared by the operating system each time it is initially loaded. Functions that do not support <u>PCI_PME</u> generation from any D-state (that is, bits 15–11 in the power management capabilities register at offset 46h in PCI configuration space (see Section 3.17, <i>Power Management Capabilities Register</i>) equal 00000b), may hardwire this bit to be read-only, always returning a 0 when read by system software. |
| 7–5 | RSVD | R | Reserved. Bits 7–5 return 0s when read. |
| 4 | DYN_DATA | R | Dynamic data. Bit 4 returns 0 when read since the TSB12LV26 device does not report dynamic data. |
| 3–2 | RSVD | R | Reserved. Bits 3 and 2 return 0s when read. |
| 1–0 | PWR_STATE | R/W | Power state. This 2-bit field sets the TSB12LV26 device power state and is encoded as follows: 00 = Current power state is D0. 01 = Current power state is D1 (not supported by this device). 10 = Current power state is D2. 11 = Current power state is D3 _{hot} . |

3.19 Power Management Extension Register

The power management extension register provides extended power management features not applicable to the TSB12LV26 device; thus, it is read-only and returns 0s when read. See Table 3–16 for a complete description of the register contents.

| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---------|----------------------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Name | Power management extension | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Power management extension**
 Type: Read-only
 Offset: 4Ah
 Default: 0000h

Table 3–16. Power Management Extension Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 15–8 | PM_DATA | R | Power management data. This field returns 00h when read since the TSB12LV26 device does not report dynamic data. |
| 7–0 | PMCSR_BSE | R | Power management CSR – bridge support extensions. This field returns 00h when read since the TSB12LV26 device does not provide P2P bridging. |

3.20 Miscellaneous Configuration Register

The miscellaneous configuration register provides miscellaneous PCI-related configuration. See Table 3–17 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|-----------------------------|----|-----|----|----|-----|----|----|----|----|----|-----|-----|-----|-----|-----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Miscellaneous configuration | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Miscellaneous configuration | | | | | | | | | | | | | | | |
| Type | R/W | R | R/W | R | R | R/W | R | R | R | R | R | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Miscellaneous configuration**
 Type: Read/Write, Read-only
 Offset: F0h
 Default: 0000 2400h

Table 3–17. Miscellaneous Configuration Register

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------------|------|--|
| 31–16 | RSVD | R | Reserved. Bits 31–16 return 0s when read. |
| 15 | PME_D3COLD | R/W | PCI_PME support from D3 _{cold} . This bit programs bit 15 (PME_D3COLD) in the power management capabilities register at offset 46h in PCI configuration space (see Section 3.17, <i>Power Management Capabilities Register</i>). |
| 14 | RSVD | R | Reserved. Bit 14 returns 0 when read. |
| 13 | PME_SUPPORT_D2 | R/W | PCI_PME support. This bit programs bit 13 (PME_SUPPORT_D2) in the power management capabilities register at offset 46h in PCI configuration space (see Section 3.17, <i>Power Management Capabilities Register</i>). If wake up from the D2 power state implemented in the TSB12LV26 device is not desired, this bit is cleared to indicate to power-management software that wake-up from D2 is not supported. |
| 12–11 | RSVD | R | Reserved. Bits 12 and 11 return 0s when read. |
| 10 | D2_SUPPORT | R/W | D2 support. This bit programs bit 10 (D2_SUPPORT) in the power management capabilities register at offset 46h in PCI configuration space (see Section 3.17, <i>Power Management Capabilities Register</i>). If the D2 power state in the TSB12LV26 device is not desired, this bit is cleared to indicate to power-management software that D2 is not supported. |
| 9–5 | RSVD | R | Reserved. Bits 9–5 return 0s when read. |
| 4 | DIS_TGT_ABT | R/W | Bit 4 defaults to 0, which provides OHCI-Lynx™ compatible target abort signaling. When this bit is set to 1, it enables the no-target-abort mode, in which the TSB12LV26 device returns indeterminate data instead of signaling target abort. The link is divided into the PCI_CLK and SCLK domains. If software tries to access registers in the link that are not active because the SCLK is disabled, a target abort is issued by the link. On some systems, this can cause a problem resulting in a fatal system error. Enabling this bit allows the link to respond to these types of requests by returning FFh. It is recommended that this bit be set to 1. |
| 3 | GP2IIC | R/W | When bit 3 is set to 1, the GPIO3 and GPIO2 signals are internally routed to the SCL and SDA, respectively. The GPIO3 and GPIO2 terminals are also placed in a high-impedance state. |
| 2 | DISABLE_SCLKGATE | R/W | When bit 2 is set to 1, the internal SCLK runs identically with the chip input. This is a test feature only and must be cleared to 0 (all applications). |
| 1 | DISABLE_PCIGATE | R/W | When bit 1 is set to 1, the internal PCI clock runs identically with the chip input. This is a test feature only and must be cleared to 0 (all applications). |
| 0 | KEEP_PCLK | R/W | When bit 0 is set to 1, the PCI clock is always kept running through the PCI_CLKRUN protocol. When this bit is cleared, the PCI clock can be stopped using PCI_CLKRUN. |

3.21 Link Enhancement Control Register

The link enhancement control register implements TI proprietary bits that are initialized by software or by a serial EEPROM, if present. After these bits are set to 1, their functionality is enabled only if bit 22 (aPhyEnhanceEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, *Host Controller Control Register*) is set to 1. See Table 3–18 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|--------------------------|----|-----|-----|----|----|----|----|-----|----|----|----|----|-----|-----|----|
| Name | Link enhancement control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Link enhancement control | | | | | | | | | | | | | | | |
| Type | R | R | R/W | R/W | R | R | R | R | R/W | R | R | R | R | R/W | R/W | R |
| Default | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Link enhancement control**
 Type: Read/Write, Read-only
 Offset: F4h
 Default: 0000 1000h

Table 3–18. Link Enhancement Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|-------------|------|--|
| 31–14 | RSVD | R | Reserved. Bits 31–14 return 0s when read. |
| 13–12 | atx_thresh | R/W | <p>This field sets the initial AT threshold value, which is used until the AT FIFO is underrun. When the TSB12LV26 device retries the packet, it uses a 2K-byte threshold, resulting in a store-and-forward operation.</p> <p>00 = Threshold ~ 2K bytes resulting in a store-and-forward operation 01 = Threshold ~ 1.7K bytes (default) 10 = Threshold ~ 1K bytes 11 = Threshold ~ 512 bytes</p> <p>These bits fine-tune the asynchronous transmit threshold. For most applications the 1.7-K threshold is optimal. Changing this value may increase or decrease the 1394 latency depending on the average PCI bus latency.</p> <p>Setting the AT threshold to 1.7K, 1K, or 512 bytes results in data being transmitted at these thresholds or when an entire packet has been checked into the FIFO. If the packet to be transmitted is larger than the AT threshold, the remaining data must be received before the AT FIFO is emptied; otherwise, an underrun condition will occur, resulting in a packet error at the receiving node. As a result, the link will then commence store-and-forward operation—that is, wait until it has the complete packet in the FIFO before retransmitting it on the second attempt, to ensure delivery.</p> <p>An AT threshold of 2K results in store-and-forward operation, which means that asynchronous data will not be transmitted until an end-of-packet token is received. Restated, setting the AT threshold to 2K results in only complete packets being transmitted.</p> <p>Note that this device always uses store-and-forward when the asynchronous transmit retries register at OHCI offset 08h (see Section 4.3, <i>Asynchronous Transmit Retries Register</i>) is cleared.</p> |
| 11–8 | RSVD | R | Reserved. Bits 11–8 return 0s when read. |
| 7 | enab_unfair | R/W | Enable asynchronous priority requests. OHCI-Lynx™ compatible. Setting bit 7 to 1 enables the link to respond to requests with priority arbitration. It is recommended that this bit be set to 1. |
| 6 | RSVD | R | This bit is not assigned in the TSB12LV26 follow-on products, since this bit location loaded by the serial EEPROM from the enhancements field corresponds to bit 23 (programPhyEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>). |
| 5–3 | RSVD | R | Reserved. Bits 5–3 return 0s when read. |

Table 3–18. Link Enhancement Control Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-----|------------------|------|---|
| 2 | enab_insert_idle | R/W | Enable insert idle. OHCI-Lynx™ compatible. When the PHY device has control of the PHY_CTL0 and PHY_CTL1 control lines and the PHY_DATA0–PHY_DATA7 data lines and the link requests control, the PHY device drives 11b on the PHY_CTL0 and PHY_CTL1 lines. The link can then start driving these lines immediately. Setting bit 2 to 1 inserts an idle state, so the link waits one clock cycle before it starts driving the lines (turnaround time). It is recommended that this bit be set to 1. |
| 1 | enab_accel | R/W | Enable acceleration enhancements. OHCI-Lynx™ compatible. When bit 1 is set to 1, the PHY device is notified that the link supports the IEEE 1394a-2000 acceleration enhancements, that is, ack-accelerated, fly-by concatenation, etc. It is recommended that this bit be set to 1. |
| 0 | RSVD | R | Reserved. Bit 0 returns 0 when read. |

3.22 Subsystem Access Register

Write access to the subsystem access register updates the subsystem identification registers identically to OHCI-Lynx™. The system ID value written to this register may also be read back from this register. See Table 3–19 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Subsystem access | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Subsystem access | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Subsystem access**
 Type: Read/Write
 Offset: F8h
 Default: 0000 0000h

Table 3–19. Subsystem Access Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|--|
| 31–16 | SUBDEV_ID | R/W | Subsystem device ID alias. This field indicates the subsystem device ID. |
| 15–0 | SUBVEN_ID | R/W | Subsystem vendor ID alias. This field indicates the subsystem vendor ID. |

3.23 GPIO Control Register

The GPIO control register has the control and status bits for the GPIO2 and GPIO3 ports. See Table 3–20 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|--------------|----|-----|-----|----|----|----|-----|-----|----|-----|-----|----|----|----|-----|
| Name | GPIO control | | | | | | | | | | | | | | | |
| Type | R/W | R | R/W | R/W | R | R | R | RWU | R/W | R | R/W | R/W | R | R | R | RWU |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | GPIO control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **GPIO control**
 Type: Read/Write/Update, Read/Write, Read-only
 Offset: FCh
 Default: 0000 0000h

Table 3–20. GPIO Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|--|
| 31 | INT_3EN | R/W | When bit 31 is set to 1, a TSB12LV26 general-purpose interrupt event occurs on a level change of the GPIO3 input. This event can generate an interrupt, with mask and event status reported through the interrupt mask register at OHCI offset 88h/8Ch (see Section 4.22, <i>Interrupt Mask Register</i>) and interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>). |
| 30 | RSVD | R | Reserved. Bit 30 returns 0 when read. |
| 29 | GPIO_INV3 | R/W | GPIO3 polarity invert. When bit 29 is set to 1, the polarity of GPIO3 is inverted. |
| 28 | GPIO_ENB3 | R/W | GPIO3 enable control. When bit 28 is set to 1, the output is enabled. Otherwise, the output is high impedance. |
| 27–25 | RSVD | R | Reserved. Bits 27–25 return 0s when read. |
| 24 | GPIO_DATA3 | RWU | GPIO3 data. Reads from bit 24 return the logical value of the input to GPIO3. Writes to this bit update the value to drive to GPIO3 when output is enabled. |
| 23 | INT_2EN | R/W | When bit 23 is set to 1, a TSB12LV26 general-purpose interrupt event occurs on a level change of the GPIO2 input. This event may generate an interrupt, with mask and event status reported through the interrupt mask register at OHCI offset 88h/8Ch (see Section 4.22, <i>Interrupt Mask Register</i>) and interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>). |
| 22 | RSVD | R | Reserved. Bit 22 returns 0 when read. |
| 21 | GPIO_INV2 | R/W | GPIO2 polarity invert. When bit 21 is set to 1, the polarity of GPIO2 is inverted. |
| 20 | GPIO_ENB2 | R/W | GPIO2 enable control. When bit 20 is set to 1, the output is enabled. Otherwise, the output is high impedance. |
| 19–17 | RSVD | R | Reserved. Bits 19–17 return 0s when read. |
| 16 | GPIO_DATA2 | RWU | GPIO2 data. Reads from bit 16 return the logical value of the input to GPIO2. Writes to this bit update the value to drive to GPIO2 when the output is enabled. |
| 15–0 | RSVD | R | Reserved. Bits 15–0 return 0s when read. |

4 OHCI Registers

The OHCI registers defined by the *1394 Open Host Controller Interface Specification* are memory-mapped into a 2K-byte region of memory pointed to by the OHCI base address register at offset 10h in PCI configuration space (see Section 3.9, *OHCI Base Address Register*). These registers are the primary interface for controlling the TSB12LV26 IEEE 1394 link function.

This section provides the register interface and bit descriptions. Several set/clear register pairs in this programming model are implemented to solve various issues with typical read-modify-write control registers. There are two addresses for a set/clear register: RegisterSet and RegisterClear. See Table 4–1 for a register listing. A 1 bit written to RegisterSet causes the corresponding bit in the set/clear register to be set to 1; a 0 bit leaves the corresponding bit unaffected. A 1 bit written to RegisterClear causes the corresponding bit in the set/clear register to be cleared; a 0 bit leaves the corresponding bit in the set/clear register unaffected.

Typically, a read from either RegisterSet or RegisterClear returns the contents of the set or clear register, respectively. However, sometimes reading the RegisterClear provides a masked version of the set or clear register. The interrupt event register is an example of this behavior.

Table 4–1. OHCI Register Map

| DMA CONTEXT | REGISTER NAME | ABBREVIATION | OFFSET |
|-------------|-------------------------------|----------------------|---------|
| — | OHCI version | Version | 00h |
| | GUID ROM | GUID_ROM | 04h |
| | Asynchronous transmit retries | ATRetries | 08h |
| | CSR data | CSRData | 0Ch |
| | CSR compare data | CSRCompareData | 10h |
| | CSR control | CSRControl | 14h |
| | Configuration ROM header | ConfigROMhdr | 18h |
| | Bus identification | BusID | 1Ch |
| | Bus options | BusOptions | 20h |
| | GUID high | GUIDHi | 24h |
| | GUID low | GUIDLo | 28h |
| | Reserved | — | 2Ch–30h |
| | Configuration ROM map | ConfigROMmap | 34h |
| | Posted write address low | PostedWriteAddressLo | 38h |
| | Posted write address high | PostedWriteAddressHi | 3Ch |
| | Vendor identification | VendorID | 40h–4Ch |
| | Host controller control | HCControlSet | 50h |
| | | HCControlClr | 54h |
| | Reserved | — | 58h–5Ch |

Table 4–1. OHCI Register Map (Continued)

| DMA CONTEXT | REGISTER NAME | ABBREVIATION | OFFSET |
|----------------------|---------------------------------------|------------------------------|---------|
| Self ID | Reserved | — | 60h |
| | Self ID buffer | SelfIDBuffer | 64h |
| | Self ID count | SelfIDCount | 68h |
| | Reserved | — | 6Ch |
| — | Isochronous receive channel mask high | IRChannelMaskHiSet | 70h |
| | | IRChannelMaskHiClear | 74h |
| | Isochronous receive channel mask low | IRChannelMaskLoSet | 78h |
| | | IRChannelMaskLoClear | 7Ch |
| | Interrupt event | IntEventSet | 80h |
| | | IntEventClear | 84h |
| | Interrupt mask | IntMaskSet | 88h |
| | | IntMaskClear | 8Ch |
| | Isochronous transmit interrupt event | IsoXmitIntEventSet | 90h |
| | | IsoXmitIntEventClear | 94h |
| | Isochronous transmit interrupt mask | IsoXmitIntMaskSet | 98h |
| | | IsoXmitIntMaskClear | 9Ch |
| — | Isochronous receive interrupt event | IsoRecvIntEventSet | A0h |
| | | IsoRecvIntEventClear | A4h |
| | Isochronous receive interrupt mask | IsoRecvIntMaskSet | A8h |
| | | IsoRecvIntMaskClear | ACh |
| | Reserved | | B0h–D8h |
| | Fairness control | FairnessControl | DCh |
| | Link control | LinkControlSet | E0h |
| | | LinkControlClear | E4h |
| | Node identification | NodeID | E8h |
| | PHY layer control | PhyControl | ECh |
| | Isochronous cycle timer | IsocycTimer | F0h |
| | Reserved | | F4h–FCh |
| | Asynchronous request filter high | AsyncRequestFilterHiSet | 100h |
| | | AsyncRequestFilterHiClear | 104h |
| | Asynchronous request filter low | AsyncRequestFilterLoSet | 108h |
| | | AsyncRequestFilterLoClear | 10Ch |
| | Physical request filter high | PhysicalRequestFilterHiSet | 110h |
| | | PhysicalRequestFilterHiClear | 114h |
| | Physical request filter low | PhysicalRequestFilterLoSet | 118h |
| | | PhysicalRequestFilterLoClear | 11Ch |
| Physical upper bound | PhysicalUpperBound | 120h | |
| Reserved | — | 124h–17Ch | |

Table 4–1. OHCI Register Map (Continued)

| DMA CONTEXT | REGISTER NAME | ABBREVIATION | OFFSET |
|---|--|---------------------|-------------|
| Asynchronous Request Transmit [ATRQ] | Asynchronous context control | ContextControlSet | 180h |
| | | ContextControlClear | 184h |
| | Reserved | — | 188h |
| | Asynchronous context command pointer | CommandPtr | 18Ch |
| | Reserved | — | 190h–19Ch |
| Asynchronous Response Transmit [ATRS] | Asynchronous context control | ContextControlSet | 1A0h |
| | | ContextControlClear | 1A4h |
| | Reserved | — | 1A8h |
| | Asynchronous context command pointer | CommandPtr | 1ACh |
| | Reserved | — | 1B0h–1BCh |
| Asynchronous Request Receive [ARRQ] | Asynchronous context control | ContextControlSet | 1C0h |
| | | ContextControlClear | 1C4h |
| | Reserved | — | 1C8h |
| | Asynchronous context command pointer | CommandPtr | 1CCh |
| | Reserved | — | 1D0h–1DCh |
| Asynchronous Response Receive [ARRS] | Asynchronous context control | ContextControlSet | 1E0h |
| | | ContextControlClear | 1E4h |
| | Reserved | — | 1E8h |
| | Asynchronous context command pointer | CommandPtr | 1ECh |
| | Reserved | — | 1F0h–1FCh |
| Isochronous Transmit Context n n = 0, 1, 2, 3, ..., 7 | Isochronous transmit context control | ContextControlSet | 200h + 16*n |
| | | ContextControlClear | 204h + 16*n |
| | Reserved | — | 208h + 16*n |
| | Isochronous transmit context command pointer | CommandPtr | 20Ch + 16*n |
| | Reserved | — | 280h–3FCh |
| Isochronous Receive Context n n = 0, 1, 2, 3 | Isochronous receive context control | ContextControlSet | 400h + 32*n |
| | | ContextControlClear | 404h + 32*n |
| | Reserved | — | 408h + 32*n |
| | Isochronous receive context command pointer | CommandPtr | 40Ch + 32*n |
| | Context match | ContextMatch | 410h + 32*n |

4.1 OHCI Version Register

The OHCI version register indicates the OHCI version support and whether or not the serial EEPROM is present. See Table 4–2 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | OHCI version | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | OHCI version | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **OHCI version**
 Type: Read-only
 Offset: 00h
 Default: 0X01 0000h

Table 4–2. OHCI Version Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|---|
| 31–25 | RSVD | R | Reserved. Bits 31–25 return 0s when read. |
| 24 | GUID_ROM | R | The TSB12LV26 device sets bit 24 to 1 if the serial EEPROM is detected. If the serial EEPROM is present, the Bus_Info_Block is automatically loaded on system (hardware) reset. |
| 23–16 | version | R | Major version of the OHCI. The TSB12LV26 device is compliant with the <i>1394 Open Host Controller Interface Specification</i> ; thus, this field reads 01h. |
| 15–8 | RSVD | R | Reserved. Bits 15–8 return 0s when read. |
| 7–0 | revision | R | Minor version of the OHCI. The TSB12LV26 device is compliant with the <i>1394 Open Host Controller Interface Specification</i> ; thus, this field reads 00h. |

4.2 GUID ROM Register

The GUID ROM register accesses the serial EEPROM and is applicable only if bit 24 (GUID_ROM) in the OHCI version register at OHCI offset 00h (see Section 4.1, *OHCI Version Register*) is set to 1. See Table 4–3 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|----------|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | GUID ROM | | | | | | | | | | | | | | | |
| Type | RSU | R | R | R | R | R | RSU | R | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | GUID ROM | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **GUID ROM**
 Type: Read/Set/Update, Read/Update, Read-only
 Offset: 04h
 Default: 00XX 0000h

Table 4–3. GUID ROM Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|--|
| 31 | addrReset | RSU | Software sets bit 31 to 1 to reset the GUID ROM address to 0. When the TSB12LV26 device completes the reset, it clears this bit. The TSB12LV26 device does not automatically fill bits 23–16 (rdData field) with the 0 th byte. |
| 30–26 | RSVD | R | Reserved. Bits 30–26 return 0s when read. |
| 25 | rdStart | RSU | A read of the currently addressed byte is started when bit 25 is set to 1. This bit is automatically cleared when the TSB12LV26 device completes the read of the currently addressed GUID ROM byte. |
| 24 | RSVD | R | Reserved. Bit 24 returns 0 when read. |
| 23–16 | rdData | RU | This field contains the data read from the GUID ROM. |
| 15–0 | RSVD | R | Reserved. Bits 15–0 return 0s when read. |

4.3 Asynchronous Transmit Retries Register

The asynchronous transmit retries register indicates the number of times the TSB12LV26 device attempts a retry for asynchronous DMA request transmit and for asynchronous physical and DMA response transmit. See Table 4–4 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|---------|-------------------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Asynchronous transmit retries | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Asynchronous transmit retries | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Asynchronous transmit retries**
 Type: Read/Write, Read-only
 Offset: 08h
 Default: 0000 0000h

Table 4–4. Asynchronous Transmit Retries Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|--------------------|------|--|
| 31–29 | secondLimit | R | The second limit field returns 0s when read, because outbound dual-phase retry is not implemented. |
| 28–16 | cycleLimit | R | The cycle limit field returns 0s when read, because outbound dual-phase retry is not implemented. |
| 15–12 | RSVD | R | Reserved. Bits 15–12 return 0s when read. |
| 11–8 | maxPhysRespRetries | R/W | The maxPhysRespRetries field tells the physical response unit how many times to attempt to retry the transmit operation for the response packet when a busy acknowledge or ack_data_error is received from the target node. |
| 7–4 | maxATRespRetries | R/W | The maxATRespRetries field tells the asynchronous transmit response unit how many times to attempt to retry the transmit operation for the response packet when a busy acknowledge or ack_data_error is received from the target node. |
| 3–0 | maxATReqRetries | R/W | The maxATReqRetries field tells the asynchronous transmit DMA request unit how many times to attempt to retry the transmit operation for the response packet when a busy acknowledge or ack_data_error is received from the target node. |

4.4 CSR Data Register

The CSR data register accesses the bus-management CSR registers from the host through compare-swap operations. This register contains the data to be stored in a CSR if the compare is successful.

| | | | | | | | | | | | | | | | | |
|---------|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | CSR data | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | CSR data | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **CSR data**
 Type: Read-only
 Offset: 0Ch
 Default: XXXX XXXXh

4.5 CSR Compare Register

The CSR compare register accesses the bus-management CSR registers from the host through compare-swap operations. This register contains the data to be compared with the existing value of the CSR resource.

| | | | | | | | | | | | | | | | | |
|----------------|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | CSR compare | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | CSR compare | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **CSR compare**
 Type: Read-only
 Offset: 10h
 Default: XXXX XXXXh

4.6 CSR Control Register

The CSR control register accesses the bus-management CSR registers from the host through compare-swap operations. This register controls the compare-swap operation and selects the CSR resource. See Table 4–5 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | CSR control | | | | | | | | | | | | | | | |
| Type | RU | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | CSR control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X |

Register: **CSR control**
 Type: Read/Write, Read/Update, Read-only
 Offset: 14h
 Default: 8000 000Xh

Table 4–5. CSR Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 31 | csrDone | RU | Bit 31 is set to 1 by the TSB12LV26 device when a compare-swap operation is complete. It is cleared whenever this register is written. |
| 30–2 | RSVD | R | Reserved. Bits 30–2 return 0s when read. |
| 1–0 | csrSel | R/W | This field selects the CSR resource as follows: 00 = BUS_MANAGER_ID 01 = BANDWIDTH_AVAILABLE 10 = CHANNELS_AVAILABLE_HI 11 = CHANNELS_AVAILABLE_LO |

4.7 Configuration ROM Header Register

The configuration ROM header register externally maps to the first quadlet of the 1394 configuration ROM, offset FFFF F000 0400h. See Table 4–6 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Configuration ROM header | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Configuration ROM header | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Configuration ROM header**
 Type: Read/Write
 Offset: 18h
 Default: 0000 XXXXh

Table 4–6. Configuration ROM Header Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|---|
| 31–24 | info_length | R/W | IEEE 1394 bus-management field. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 23–16 | crc_length | R/W | IEEE 1394 bus-management field. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 15–0 | rom_crc_value | R/W | IEEE 1394 bus-management field. Must be valid at any time bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. The reset value is undefined if no serial EEPROM is present. If a serial EEPROM is present, this field is loaded from the serial EEPROM. |

4.8 Bus Identification Register

The bus identification register externally maps to the first quadlet in the Bus_Info_Block and contains the constant 3133 3934h, which is the ASCII value of 1394.

| | | | | | | | | | | | | | | | | |
|----------------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Bus identification | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Bus identification | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |

Register: **Bus identification**
 Type: Read-only
 Offset: 1Ch
 Default: 3133 3934h

4.9 Bus Options Register

The bus options register externally maps to the second quadlet of the Bus_Info_Block. See Table 4–7 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|-------------|-----|-----|-----|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Bus options | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R | R | R | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | X | X | X | X | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Bus options | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R | R | R | R | R/W | R/W | R | R | R | R | R | R |
| Default | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | X | X | 0 | 0 | 0 | 0 | 1 | 0 |

Register: **Bus options**
 Type: Read/Write, Read-only
 Offset: 20h
 Default: X0XX A0X2h

Table 4–7. Bus Options Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|-------------|------|---|
| 31 | irmc | R/W | Isochronous resource-manager capable. IEEE 1394 bus-management field. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 30 | cmc | R/W | Cycle master capable. IEEE 1394 bus-management field. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 29 | isc | R/W | Isochronous support capable. IEEE 1394 bus-management field. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 28 | bmc | R/W | Bus manager capable. IEEE 1394 bus-management field. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 27 | pmc | R/W | Power-management capable. IEEE 1394 bus-management field. When bit 27 is set to 1, this indicates that the node is power-management capable. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 26–24 | RSVD | R | Reserved. Bits 26–24 return 0s when read. |
| 23–16 | cyc_clk_acc | R/W | Cycle master clock accuracy, in parts per million. IEEE 1394 bus-management field. Must be valid when bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. |
| 15–12 | max_rec | R/W | Maximum request. IEEE 1394 bus-management field. Hardware initializes this field to indicate the maximum number of bytes in a block request packet that is supported by the implementation. This value, max_rec_bytes, must be 512 or greater, and is calculated by $2^{(\text{max_rec} + 1)}$. Software may change this field; however, this field must be valid at any time bit 17 (linkEnable) in the host controller control register at OHCI offset 50h/54h (see Section 4.16, <i>Host Controller Control Register</i>) is set to 1. A received block write request packet with a length greater than max_rec_bytes may generate an ack_type_error. This field is not affected by a software reset, and defaults to a value indicating 2048 bytes on a system (hardware) reset. |
| 11–8 | RSVD | R | Reserved. Bits 11–8 return 0s when read. |
| 7–6 | g | R/W | Generation counter. This field is incremented if any portion of the configuration ROM has been incremented since the prior bus reset. |
| 5–3 | RSVD | R | Reserved. Bits 5–3 return 0s when read. |
| 2–0 | Lnk_spd | R | Link speed. This field returns 010, indicating that the link speeds of 100M bits/s, 200M bits/s, and 400M bits/s are supported. |

4.10 GUID High Register

The GUID high register represents the upper quadlet in a 64-bit global unique ID (GUID) which maps to the third quadlet in the Bus_Info_Block. This register contains node_vendor_ID and chip_ID_hi fields. This register initializes to 0s on a system (hardware) reset, which is an illegal GUID value. If a serial EEPROM is detected, the contents of this register are loaded through the serial EEPROM interface after a PCI_RST. At that point, the contents of this register cannot be changed. If no serial EEPROM is detected, the contents of this register are loaded by the BIOS after a PCI_RST. At that point, the contents of this register cannot be changed.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | GUID high | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | GUID high | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **GUID high**
 Type: Read-only
 Offset: 24h
 Default: 0000 0000h

4.11 GUID Low Register

The GUID low register represents the lower quadlet in a 64-bit global unique ID (GUID) which maps to chip_ID_lo in the Bus_Info_Block. This register initializes to 0s on a system (hardware) reset and behaves identically to the GUID high register at OHCI offset 24h (see Section 4.10, *GUID High Register*).

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | GUID low | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | GUID low | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **GUID low**
 Type: Read-only
 Offset: 28h
 Default: 0000 0000h

4.12 Configuration ROM Mapping Register

The configuration ROM mapping register contains the start address within system memory that maps to the start address of 1394 configuration ROM for this node. See Table 4–8 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Configuration ROM mapping | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Configuration ROM mapping | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Configuration ROM mapping**
 Type: Read/Write, Read-only
 Offset: 34h
 Default: 0000 0000h

Table 4–8. Configuration ROM Mapping Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|---------------|------|---|
| 31–10 | configROMAddr | R/W | If a quadlet read request to 1394 offset FFFF F000 0400h through offset FFFF F000 07FFh is received, the low-order 10 bits of the offset are added to this register to determine the host memory address of the read request. |
| 9–0 | RSVD | R | Reserved. Bits 9–0 return 0s when read. |

4.13 Posted Write Address Low Register

The posted write address low register communicates error information if a write request is posted and an error occurs while writing the posted data packet. See Table 4–9 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|--------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | Posted write address low | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Posted write address low | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Posted write address low**
 Type: Read/Update
 Offset: 38h
 Default: XXXX XXXXh

Table 4–9. Posted Write Address Low Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 31–0 | offsetLo | RU | The lower 32 bits of the 1394 destination offset of the write request that failed. |

4.14 Posted Write Address High Register

The posted write address high register communicates error information if a write request is posted and an error occurs while writing the posted data packet. See Table 4–10 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|---------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | Posted write address high | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Posted write address high | | | | | | | | | | | | | | | |
| Type | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Posted write address high**
 Type: Read/Update
 Offset: 3Ch
 Default: XXXX XXXXh

Table 4–10. Posted Write Address High Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|--|
| 31–16 | sourceID | RU | This field is the 10-bit bus number (bits 31–22) and 6-bit node number (bits 21–16) of the node that issued the write request that failed. |
| 15–0 | offsetHi | RU | The upper 16 bits of the 1394 destination offset of the write request that failed. |

4.15 Vendor ID Register

The vendor ID register holds the company ID of an organization that specifies any vendor-unique registers. The TSB12LV26 device does not implement Texas Instruments unique behavior with regards to OHCI. Thus, this register is read-only and returns 0s when read.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | Vendor ID | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Vendor ID | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Vendor ID**
 Type: Read-only
 Offset: 40h
 Default: 0000 0000h

4.16 Host Controller Control Register

The host controller control set/clear register pair provides flags for controlling the TSB12LV26 device. See Table 4–11 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|-------------------------|-----|----|----|----|----|----|----|----|-----|----|----|-----|-----|-----|------|
| Name | Host controller control | | | | | | | | | | | | | | | |
| Type | R | RSC | R | R | R | R | R | R | RC | RSC | R | R | RSC | RSC | RSC | RSCU |
| Default | 0 | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Host controller control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Host controller control**
 Type: Read/Set/Clear/Update, Read/Set/Clear, Read/Clear, Read-only
 Offset: 50h set register
 54h clear register
 Default: X00X 0000h

Table 4–11. Host Controller Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|-------------------|------|---|
| 31 | RSVD | R | Reserved. Bit 31 returns 0 when read. |
| 30 | noByteSwapData | RSC | Bit 30 controls whether physical accesses to locations outside the TSB12LV26 device itself, as well as any other DMA data accesses, are swapped. |
| 29–24 | RSVD | R | Reserved. Bits 29–24 return 0s when read. |
| 23 | programPhyEnable | RC | Bit 23 informs upper-level software that lower-level software has consistently configured the IEEE 1394a-2000 enhancements in the link and PHY devices. When this bit is set to 1, generic software such as the OHCI driver is responsible for configuring IEEE 1394a-2000 enhancements in the PHY device and bit 22 (aPhyEnhanceEnable) in the TSB12LV26 device. When this bit is cleared to 0, the generic software may not modify the IEEE 1394a-2000 enhancements in the TSB12LV26 or PHY device and cannot interpret the setting of bit 22 (aPhyEnhanceEnable). This bit is initialized from serial EEPROM. |
| 22 | aPhyEnhanceEnable | RSC | When bits 23 (programPhyEnable) and 17 (linkEnable) are 1, the OHCI driver can set bit 22 to 1 to use all IEEE 1394a-2000 enhancements. When bit 23 (programPhyEnable) is cleared to 0, the software does not change PHY enhancements or this bit. |
| 21–20 | RSVD | R | Reserved. Bits 21 and 20 return 0s when read. |
| 19 | LPS | RSC | Bit 19 controls the link power status. Software must set this bit to 1 to permit link-PHY communication. A 0 prevents link-PHY communication. The OHCI-link is divided into two clock domains (PCI_CLK and PHY_SCLK). If software tries to access any register in the PHY_SCLK domain while the PHY_SCLK is disabled, a target abort is issued by the link. This problem can be avoided by setting bit 4 (DIS_TGT_ABT) to 1 in the miscellaneous configuration register at offset F0h in the PCI configuration space (see Section 3.20, <i>Miscellaneous Configuration Register</i>). This allows the link to respond to these types of requests by returning all Fs (hex). It is recommended that this bit be set to 1 and is programmable via the ROM or BIOS. OHCI registers at offsets DCh–F0h and 100h–11Ch are in the PHY_SCLK domain. After setting LPS software must wait approximately 10 ms before attempting to access any of the OHCI registers. This gives the PHY_SCLK time to stabilize. |
| 18 | postedWriteEnable | RSC | Bit 18 enables (1) or disables (0) posted writes. Software must change this bit only when bit 17 (linkEnable) is 0. |

Table 4–11. Host Controller Control Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 17 | linkEnable | RSC | Bit 17 is cleared to 0 by either a system (hardware) or software reset. Software must set this bit to 1 when the system is ready to begin operation and then force a bus reset. This bit is necessary to keep other nodes from sending transactions before the local system is ready. When this bit is cleared, the TSB12LV26 device is logically and immediately disconnected from the 1394 bus, no packets are received or processed, nor are packets transmitted. |
| 16 | SoftReset | RSCU | When bit 16 is set to 1, all TSB12LV26 device states are reset, all FIFOs are flushed, and all OHCI registers are set to their system (hardware) reset values, unless otherwise specified. PCI registers are not affected by this bit. This bit remains set to 1 while the software reset is in progress and reverts back to 0 when the reset has completed. |
| 15–0 | RSVD | R | Reserved. Bits 15–0 return 0s when read. |

4.17 Self-ID Buffer Pointer Register

The self-ID buffer pointer register points to the 2K-byte aligned base address of the buffer in host memory where the self-ID packets are stored during bus initialization. Bits 31–11 are read/write accessible. Bits 10–0 are reserved, and return 0s when read.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Self-ID buffer pointer | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Self-ID buffer pointer | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Self ID-buffer pointer**
 Type: Read/Write, Read-only
 Offset: 64h
 Default: XXXX XX00h

4.18 Self-ID Count Register

The self-ID count register keeps a count of the number of times the bus self-ID process has occurred, flags self-ID packet errors, and keeps a count of the self-ID data in the self-ID buffer. See Table 4–12 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Self-ID count | | | | | | | | | | | | | | | |
| Type | RU | R | R | R | R | R | R | R | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Self-ID count | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | RU | RU | RU | RU | RU | RU | RU | RU | RU | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Self-ID count**
 Type: Read/Update, Read-only
 Offset: 68h
 Default: X0XX 0000h

Table 4–12. Self-ID Count Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------------|------|--|
| 31 | selfIDError | RU | When bit 31 is set to 1, an error was detected during the most recent self-ID packet reception. The contents of the self-ID buffer are undefined. This bit is cleared after a self-ID reception in which no errors are detected. Note that an error can be a hardware error or a host bus write error. |
| 30–24 | RSVD | R | Reserved. Bits 30–24 return 0s when read. |
| 23–16 | selfIDGeneration | RU | The value in this field increments each time a bus reset is detected. This field rolls over to 0 after reaching 255. |
| 15–11 | RSVD | R | Reserved. Bits 15–11 return 0s when read. |
| 10–2 | selfIDSize | RU | This field indicates the number of quadlets that have been written into the self-ID buffer for the current bits 23–16 (selfIDGeneration field). This includes the header quadlet and the self-ID data. This field is cleared to 0 when the self-ID reception begins. |
| 1–0 | RSVD | R | Reserved. Bits 1 and 0 return 0s when read. |

4.19 Isochronous Receive Channel Mask High Register

The isochronous receive channel mask high set/clear register enables packet receives from the upper 32 isochronous data channels. A read from either the set register or clear register returns the content of the isochronous receive channel mask high register. See Table 4–13 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|---------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Isochronous receive channel mask high | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous receive channel mask high | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Isochronous receive channel mask high**

Type: Read/Set/Clear

Offset: 70h set register

74h clear register

Default: XXXX XXXXh

Table 4–13. Isochronous Receive Channel Mask High Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-----|--------------|------|---|
| 31 | isoChannel63 | RSC | When bit 31 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 63. |
| 30 | isoChannel62 | RSC | When bit 30 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 62. |
| 29 | isoChannel61 | RSC | When bit 29 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 61. |
| 28 | isoChannel60 | RSC | When bit 28 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 60. |
| 27 | isoChannel59 | RSC | When bit 27 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 59. |
| 26 | isoChannel58 | RSC | When bit 26 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 58. |
| 25 | isoChannel57 | RSC | When bit 25 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 57. |
| 24 | isoChannel56 | RSC | When bit 24 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 56. |
| 23 | isoChannel55 | RSC | When bit 23 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 55. |
| 22 | isoChannel54 | RSC | When bit 22 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 54. |
| 21 | isoChannel53 | RSC | When bit 21 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 53. |
| 20 | isoChannel52 | RSC | When bit 20 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 52. |
| 19 | isoChannel51 | RSC | When bit 19 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 51. |
| 18 | isoChannel50 | RSC | When bit 18 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 50. |
| 17 | isoChannel49 | RSC | When bit 17 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 49. |
| 16 | isoChannel48 | RSC | When bit 16 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 48. |
| 15 | isoChannel47 | RSC | When bit 15 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 47. |
| 14 | isoChannel46 | RSC | When bit 14 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 46. |
| 13 | isoChannel45 | RSC | When bit 13 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 45. |
| 12 | isoChannel44 | RSC | When bit 12 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 44. |
| 11 | isoChannel43 | RSC | When bit 11 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 43. |
| 10 | isoChannel42 | RSC | When bit 10 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 42. |
| 9 | isoChannel41 | RSC | When bit 9 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 41. |
| 8 | isoChannel40 | RSC | When bit 8 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 40. |
| 7 | isoChannel39 | RSC | When bit 7 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 39. |

Table 4–13. Isochronous Receive Channel Mask High Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-----|--------------|------|--|
| 6 | isoChannel38 | RSC | When bit 6 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 38. |
| 5 | isoChannel37 | RSC | When bit 5 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 37. |
| 4 | isoChannel36 | RSC | When bit 4 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 36. |
| 3 | isoChannel35 | RSC | When bit 3 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 35. |
| 2 | isoChannel34 | RSC | When bit 2 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 34. |
| 1 | isoChannel33 | RSC | When bit 1 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 33. |
| 0 | isoChannel32 | RSC | When bit 0 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 32. |

4.20 Isochronous Receive Channel Mask Low Register

The isochronous receive channel mask low set/clear register enables packet receives from the lower 32 isochronous data channels. See Table 4–14 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|--------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Isochronous receive channel mask low | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous receive channel mask low | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Isochronous receive channel mask low**
 Type: Read/Set/Clear
 Offset: 78h set register
 7Ch clear register
 Default: XXXX XXXXh

Table 4–14. Isochronous Receive Channel Mask Low Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|--------------|------|--|
| 31 | isoChannel31 | RSC | When bit 31 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 31. |
| 30 | isoChannel30 | RSC | When bit 30 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 30. |
| 29–2 | isoChanneln | RSC | Bits 29 through 2 (isoChanneln, where n = 29, 28, 27, ..., 2) follow the same pattern as bits 31 and 30. |
| 1 | isoChannel1 | RSC | When bit 1 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 1. |
| 0 | isoChannel0 | RSC | When bit 0 is set to 1, the TSB12LV26 device is enabled to receive from isochronous channel number 0. |

4.21 Interrupt Event Register

The interrupt event set/clear register reflects the state of the various TSB12LV26 interrupt sources. The interrupt bits are set to 1 by an asserting edge of the corresponding interrupt signal or by writing a 1 in the corresponding bit in the set register. The only mechanism to clear a bit in this register is to write a 1 to the corresponding bit in the clear register.

This register is fully compliant with the *1394 Open Host Controller Interface Specification*, and the TSB12LV26 device adds a vendor-specific interrupt function to bit 30. When the interrupt event register is read, the return value is the bit-wise AND function of the interrupt event and interrupt mask registers. See Table 4–15 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|-----------------|-----|----|----|----|------|------|------|------|------|------|------|------|------|------|------|
| Name | Interrupt event | | | | | | | | | | | | | | | |
| Type | R | RSC | R | R | R | RSCU | RSCU | RSCU | RSCU | RSCU | RSCU | RSCU | RSCU | R | RSCU | RSCU |
| Default | 0 | X | 0 | 0 | 0 | X | X | X | X | X | X | X | X | 0 | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Interrupt event | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | RSCU | RSCU | RU | RU | RSCU | RSCU | RSCU | RSCU | RSCU | RSCU |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X | X | X |

Register: **Interrupt event**
 Type: Read/Set/Clear/Update, Read/Set/Clear, Read/Update, Read-only
 Offset: 80h set register
 84h clear register [returns the contents of the interrupt event register bit-wise ANDed with the interrupt mask register when read]
 Default: XXXX 0XXXh

Table 4–15. Interrupt Event Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|--------------------|------|--|
| 31 | RSVD | R | Reserved. Bit 31 returns 0 when read. |
| 30 | vendorSpecific | RSC | This vendor-specific interrupt event is reported when either of the general-purpose interrupts are asserted. The general-purpose interrupts are enabled by setting the corresponding bits INT3_EN and INT_2EN (bits 31 and 23, respectively) to 1 in the GPIO control register at offset FCh in the PCI configuration space (see Section 3.23, <i>GPIO Control Register</i>). |
| 29–27 | RSVD | R | Reserved. Bits 29–27 return 0s when read. |
| 26 | phyRegRcvd | RSCU | The TSB12LV26 device has received a PHY register data byte which can be read from bits 23–16 in the PHY layer control register at OHCI offset ECh (see Section 4.30, <i>PHY Layer Control Register</i>). |
| 25 | cycleTooLong | RSCU | If bit 21 (cycleMaster) in the link control register at OHCI offset E0h/E4h (see Section 4.28, <i>Link Control Register</i>) is set to 1, this indicates that over 125 μs have elapsed between the start of sending a cycle start packet and the end of a subaction gap. Bit 21 (cycleMaster) in the link control register is cleared by this event. |
| 24 | unrecoverableError | RSCU | This event occurs when the TSB12LV26 device encounters any error that forces it to stop operations on any or all of its subunits, for example, when a DMA context sets its dead bit to 1. While bit 24 is set to 1, all normal interrupts for the context(s) that caused this interrupt are blocked from being set to 1. |
| 23 | cycleInconsistent | RSCU | A cycle start was received that had values for the cycleSeconds and cycleCount fields that are different from the values in bits 31–25 (cycleSeconds field) and bits 24–12 (cycleCount field) in the isochronous cycle timer register at OHCI offset F0h (see Section 4.31, <i>Isochronous Cycle Timer Register</i>). |
| 22 | cycleLost | RSCU | A lost cycle is indicated when no cycle_start packet is sent or received between two successive cycleSynch events. A lost cycle can be predicted when a cycle_start packet does not immediately follow the first subaction gap after the cycleSynch event or if an arbitration reset gap is detected after a cycleSynch event without an intervening cycle start. Bit 22 may be set to 1 either when a lost cycle occurs or when logic predicts that one will occur. |
| 21 | cycle64Seconds | RSCU | Indicates that the 7 th bit of the cycle second counter has changed. |

Table 4–15. Interrupt Event Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|----------------|------|--|
| 20 | cycleSynch | RSCU | Indicates that a new isochronous cycle has started. Bit 20 is set to 1 when the low-order bit of the cycle count toggles. |
| 19 | phy | RSCU | Indicates that the PHY device requests an interrupt through a status transfer. |
| 18 | RSVD | R | Reserved. Bit 18 returns 0 when read. |
| 17 | busReset | RSCU | Indicates that the PHY device has entered bus reset mode. |
| 16 | selfIDcomplete | RSCU | A self-ID packet stream has been received. It is generated at the end of the bus initialization process. Bit 16 is turned off simultaneously when bit 17 (busReset) is turned on. |
| 15–10 | RSVD | R | Reserved. Bits 15–10 return 0s when read. |
| 9 | lockRespErr | RSCU | Indicates that the TSB12LV26 device sent a lock response for a lock request to a serial bus register, but did not receive an ack_complete. |
| 8 | postedWriteErr | RSCU | Indicates that a host bus error occurred while the TSB12LV26 device was trying to write a 1394 write request, which had already been given an ack_complete, into system memory. |
| 7 | isochRx | RU | Isynchronous receive DMA interrupt. Indicates that one or more isochronous receive contexts have generated an interrupt. This is not a latched event; it is the logical OR of all bits in the isochronous receive interrupt event register at OHCI offset A0h/A4h (see Section 4.25, <i>Isynchronous Receive Interrupt Event Register</i>) and the isochronous receive interrupt mask register at OHCI offset A8h/ACh (see Section 4.26, <i>Isynchronous Receive Interrupt Mask Register</i>). The isochronous receive interrupt event register indicates which contexts have been interrupted. |
| 6 | isochTx | RU | Isynchronous transmit DMA interrupt. Indicates that one or more isochronous transmit contexts have generated an interrupt. This is not a latched event; it is the logical OR of all bits in the isochronous transmit interrupt event register at OHCI offset 90h/94h (see Section 4.23, <i>Isynchronous Transmit Interrupt Event Register</i>) and the isochronous transmit interrupt mask register at OHCI offset 98h/9Ch (see Section 4.24, <i>Isynchronous Transmit Interrupt Mask Register</i>). The isochronous transmit interrupt event register indicates which contexts have been interrupted. |
| 5 | RSPkt | RSCU | Indicates that a packet was sent to an asynchronous receive response context buffer and the descriptor xferStatus and resCount fields have been updated. |
| 4 | RQPkt | RSCU | Indicates that a packet was sent to an asynchronous receive request context buffer and the descriptor xferStatus and resCount fields have been updated. |
| 3 | ARRS | RSCU | Asynchronous receive response DMA interrupt. Bit 3 is conditionally set to 1 upon completion of an ARRS DMA context command descriptor. |
| 2 | ARRQ | RSCU | Asynchronous receive request DMA interrupt. Bit 2 is conditionally set to 1 upon completion of an ARRQ DMA context command descriptor. |
| 1 | respTxComplete | RSCU | Asynchronous response transmit DMA interrupt. Bit 1 is conditionally set to 1 upon completion of an ATRS DMA command. |
| 0 | reqTxComplete | RSCU | Asynchronous request transmit DMA interrupt. Bit 0 is conditionally set to 1 upon completion of an ATRQ DMA command. |

4.22 Interrupt Mask Register

The interrupt mask set/clear register enables the various TSB12LV26 interrupt sources. Reads from either the set register or the clear register always return the contents of the interrupt mask register. In all cases except masterIntEnable (bit 31) and VendorSpecific (bit 30), the enables for each interrupt event align with the interrupt event register bits detailed in Table 4–15. See Table 4–16 for a description of bits 31 and 30.

This register is fully compliant with the *1394 Open Host Controller Interface Specification*, and the TSB12LV26 device adds a vendor-specific interrupt function to bit 30.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|----------------|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Interrupt mask | | | | | | | | | | | | | | | |
| Type | RSCU | RSC | R | R | R | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | R | RSC | RSC |
| Default | X | X | 0 | 0 | 0 | X | X | X | X | X | X | X | X | 0 | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Interrupt mask | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X | X | X |

Register: **Interrupt mask**
 Type: Read/Set/Clear/Update, Read/Set/Clear, Read/Update, Read-only
 Offset: 88h set register
 8Ch clear register
 Default: XXXX 0XXXh

Table 4–16. Interrupt Mask Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|--------------------|------|---|
| 31 | masterIntEnable | RSCU | Master interrupt enable. If bit 31 is set to 1, external interrupts are generated in accordance with the interrupt mask register. If this bit is cleared, external interrupts are not generated regardless of the interrupt mask register settings. |
| 30 | vendorSpecific | RSC | When this bit and bit 30 (vendorSpecific) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this vendor-specific interrupt mask enables interrupt generation. |
| 29–27 | RSVD | R | Reserved. Bits 29–27 return 0s when read. |
| 26 | phyRegRcvd | RSC | When this bit and bit 26 (phyRegRcvd) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this PHY-register interrupt mask enables interrupt generation. |
| 25 | cycleTooLong | RSC | When this bit and bit 25 (cycleTooLong) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this cycle-too-long interrupt mask enables interrupt generation. |
| 24 | unrecoverableError | RSC | When this bit and bit 24 (unrecoverableError) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this unrecoverable-error interrupt mask enables interrupt generation. |
| 23 | cycleInconsistent | RSC | When this bit and bit 23 (cycleInconsistent) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this inconsistent-cycle interrupt mask enables interrupt generation. |
| 22 | cycleLost | RSC | When this bit and bit 22 (cycleLost) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this lost-cycle interrupt mask enables interrupt generation. |
| 21 | cycle64Seconds | RSC | When this bit and bit 21 (cycle64Seconds) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this 64-second-cycle interrupt mask enables interrupt generation. |
| 20 | cycleSynch | RSC | When this bit and bit 20 (cycleSynch) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this isochronous-cycle interrupt mask enables interrupt generation. |

Table 4–16. Interrupt Mask Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|----------------|------|---|
| 19 | phy | RSC | When this bit and bit 19 (phy) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this PHY-status-transfer interrupt mask enables interrupt generation. |
| 18 | RSVD | R | Reserved. Bit 18 returns 0 when read. |
| 17 | busReset | RSC | When this bit and bit 17 (busReset) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this bus-reset interrupt mask enables interrupt generation. |
| 16 | selfIDcomplete | RSC | When this bit and bit 16 (selfIDcomplete) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this self-ID-complete interrupt mask enables interrupt generation. |
| 15–10 | RSVD | R | Reserved. Bits 15–10 return 0s when read. |
| 9 | lockRespErr | RSC | When this bit and bit 9 (lockRespErr) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this lock-response-error interrupt mask enables interrupt generation. |
| 8 | postedWriteErr | RSC | When this bit and bit 8 (postedWriteErr) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this posted-write-error interrupt mask enables interrupt generation. |
| 7 | isochRx | RSC | When this bit and bit 7 (isochRx) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this isochronous-receive-DMA interrupt mask enables interrupt generation. |
| 6 | isochTx | RSC | When this bit and bit 6 (isochTx) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this isochronous-transmit-DMA interrupt mask enables interrupt generation. |
| 5 | RSPkt | RSC | When this bit and bit 5 (RSPkt) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this receive-response-packet interrupt mask enables interrupt generation. |
| 4 | RQPkt | RSC | When this bit and bit 4 (RQPkt) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this receive-request-packet interrupt mask enables interrupt generation. |
| 3 | ARRS | RSC | When this bit and bit 3 (ARRS) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this asynchronous-receive-response-DMA interrupt mask enables interrupt generation. |
| 2 | ARRQ | RSC | When this bit and bit 2 (ARRQ) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this asynchronous-receive-request-DMA interrupt mask enables interrupt generation. |
| 1 | respTxComplete | RSC | When this bit and bit 1 (respTxComplete) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this response-transmit-complete interrupt mask enables interrupt generation. |
| 0 | reqTxComplete | RSC | When this bit and bit 0 (reqTxComplete) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) are set to 1, this request-transmit-complete interrupt mask enables interrupt generation. |

4.23 Isochronous Transmit Interrupt Event Register

The isochronous transmit interrupt event set/clear register reflects the interrupt state of the isochronous transmit contexts. An interrupt is generated on behalf of an isochronous transmit context if an OUTPUT_LAST* command completes and its interrupt bits are set to 1. Upon determining that the isoChTx (bit 6) interrupt in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, *Interrupt Event Register*) has occurred, software can check this register to determine which context(s) caused the interrupt. The interrupt bits are set to 1 by an asserting edge of the corresponding interrupt signal, or by writing a 1 in the corresponding bit in the set register. The only mechanism to clear a bit in this register is to write a 1 to the corresponding bit in the clear register. See Table 4–17 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|--------------------------------------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Isochronous transmit interrupt event | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous transmit interrupt event | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |

Register: **Isochronous transmit interrupt event**
 Type: Read/Set/Clear, Read-only
 Offset: 90h set register
 94h clear register [returns the contents of the isochronous transmit interrupt event register bit-wise ANDed with the isochronous transmit interrupt mask register when read]
 Default: 0000 00XXh

Table 4–17. Isochronous Transmit Interrupt Event Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|---|
| 31–8 | RSVD | R | Reserved. Bits 31–8 return 0s when read. |
| 7 | isoXmit7 | RSC | Isochronous transmit channel 7 caused the interrupt event register bit 6 (isoChTx) interrupt. |
| 6 | isoXmit6 | RSC | Isochronous transmit channel 6 caused the interrupt event register bit 6 (isoChTx) interrupt. |
| 5 | isoXmit5 | RSC | Isochronous transmit channel 5 caused the interrupt event register bit 6 (isoChTx) interrupt. |
| 4 | isoXmit4 | RSC | Isochronous transmit channel 4 caused the interrupt event register bit 6 (isoChTx) interrupt. |
| 3 | isoXmit3 | RSC | Isochronous transmit channel 3 caused the interrupt event register bit 6 (isoChTx) interrupt. |
| 2 | isoXmit2 | RSC | Isochronous transmit channel 2 caused the interrupt event register bit 6 (isoChTx) interrupt. |
| 1 | isoXmit1 | RSC | Isochronous transmit channel 1 caused the interrupt event register bit 6 (isoChTx) interrupt. |
| 0 | isoXmit0 | RSC | Isochronous transmit channel 0 caused the interrupt event register bit 6 (isoChTx) interrupt. |

4.24 Isochronous Transmit Interrupt Mask Register

The isochronous transmit interrupt mask set/clear register enables the isochTx interrupt source on a per-channel basis. Reads from either the set register or the clear register always return the contents of the isochronous transmit interrupt mask register. In all cases, the enables for each interrupt event align with the isochronous transmit interrupt event register bits detailed in Table 4–17.

| | | | | | | | | | | | | | | | | |
|----------------|-------------------------------------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Isochronous transmit interrupt mask | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous transmit interrupt mask | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |

Register: **Isochronous transmit interrupt mask**
 Type: Read/Set/Clear, Read-only
 Offset: 98h set register
 9Ch clear register
 Default: 0000 00XXh

4.25 Isochronous Receive Interrupt Event Register

The isochronous receive interrupt event set/clear register reflects the interrupt state of the isochronous receive contexts. An interrupt is generated on behalf of an isochronous receive context if an INPUT_* command completes and its interrupt bits are set to 1. Upon determining that the isoChRx (bit 7) interrupt in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, *Interrupt Event Register*) has occurred, software can check this register to determine which context(s) caused the interrupt. The interrupt bits are set to 1 by the asserting edge of the corresponding interrupt signal, or by writing a 1 to the corresponding bit in the set register. The only mechanism to clear a bit in this register is to write a 1 to the corresponding bit in the clear register. See Table 4–18 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|-------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Isochronous receive interrupt event | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous receive interrupt event | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X |

Register: **Isochronous receive interrupt event**
 Type: Read/Set/Clear, Read-only
 Offset: A0h set register
 A4h clear register [returns the contents of the isochronous receive interrupt event register bit-wise ANDed with the isochronous receive mask register when read]
 Default: 0000 000Xh

Table 4–18. Isochronous Receive Interrupt Event Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|--|
| 31–4 | RSVD | R | Reserved. Bits 31–4 return 0s when read. |
| 3 | isoRecv3 | RSC | Isochronous receive channel 3 caused the interrupt event register bit 7 (isoChRx) interrupt. |
| 2 | isoRecv2 | RSC | Isochronous receive channel 2 caused the interrupt event register bit 7 (isoChRx) interrupt. |
| 1 | isoRecv1 | RSC | Isochronous receive channel 1 caused the interrupt event register bit 7 (isoChRx) interrupt. |
| 0 | isoRecv0 | RSC | Isochronous receive channel 0 caused the interrupt event register bit 7 (isoChRx) interrupt. |

4.26 Isochronous Receive Interrupt Mask Register

The isochronous receive interrupt mask set/clear register enables the isochRx interrupt source on a per-channel basis. Reads from either the set register or the clear register always return the contents of the isochronous receive interrupt mask register. In all cases, the enables for each interrupt event align with the event register bits detailed in Table 4–18.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|------------------------------------|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| Name | Isochronous receive interrupt mask | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous receive interrupt mask | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | X |

Register: **Isochronous receive interrupt mask**
 Type: Read/Set/Clear, Read-only
 Offset: A8h set register
 ACh clear register
 Default: 0000 000Xh

4.27 Fairness Control Register

The fairness control register provides a mechanism by which software can direct the host controller to transmit multiple asynchronous requests during a fairness interval. See Table 4–19 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|------------------|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Fairness control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Fairness control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Fairness control**
 Type: Read-only, Read/Write
 Offset: DCh
 Default: 0000 0000h

Table 4–19. Fairness Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|------------|------|--|
| 31–8 | RSVD | R | Reserved. Bits 31–8 return 0s when read. |
| 7–0 | pri_req | R/W | This field specifies the maximum number of priority arbitration requests for asynchronous request packets that the link is permitted to make of the PHY device during a fairness interval. |

4.28 Link Control Register

The link control set/clear register provides the control flags that enable and configure the link core protocol portions of the TSB12LV26 device. It contains controls for the receiver and cycle timer. See Table 4–20 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|--------------|----|----|----|----|-----|-----|----|----|-----|------|-----|----|----|----|----|
| Name | Link control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | RSC | RSCU | RSC | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | X | X | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Link control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | RSC | RSC | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | X | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Link control**
 Type: Read/Set/Clear/Update, Read/Set/Clear, Read-only
 Offset: E0h set register
 E4h clear register
 Default: 00X0 0X00h

Table 4–20. Link Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------------|------|--|
| 31–23 | RSVD | R | Reserved. Bits 31–23 return 0s when read. |
| 22 | cycleSource | RSC | When bit 22 is set to 1, the cycle timer uses an external source (CYCLEIN) to determine when to roll over the cycle timer. When this bit is cleared, the cycle timer rolls over when the timer reaches 3072 cycles of the 24.576-MHz clock (125 μs). |
| 21 | cycleMaster | RSCU | When bit 21 is set to 1 and the PHY device has notified the TSB12LV26 device that the PHY device is root, the TSB12LV26 device generates a cycle start packet every time the cycle timer rolls over, based on the setting of bit 22 (cycleSource). When bit 21 is cleared, the OHCI-Lynx™ accepts received cycle start packets to maintain synchronization with the node that is sending them. Bit 21 is automatically cleared when bit 25 (cycleTooLong) in the interrupt event register at OHCI offset 80h/84h (see Section 4.21, <i>Interrupt Event Register</i>) is set to 1. Bit 21 cannot be set to 1 until bit 25 (cycleTooLong) is cleared. |
| 20 | CycleTimerEnable | RSC | When bit 20 is set to 1, the cycle timer offset counts cycles of the 24.576-MHz clock and rolls over at the appropriate time, based on the settings of the above bits. When this bit is cleared, the cycle timer offset does not count. |
| 19–11 | RSVD | R | Reserved. Bits 19–11 return 0s when read. |
| 10 | RcvPhyPkt | RSC | When bit 10 is set to 1, the receiver accepts incoming PHY packets into the AR request context if the AR request context is enabled. This bit does not control receipt of self-ID packets. |
| 9 | RcvSelfID | RSC | When bit 9 is set to 1, the receiver accepts incoming self-ID packets. Before setting this bit to 1, software must ensure that the self-ID buffer pointer register contains a valid address. |
| 8–0 | RSVD | R | Reserved. Bits 8–0 return 0s when read. |

4.29 Node Identification Register

The node identification register contains the address of the node on which the OHCI-Lynx™ chip resides, and indicates the valid node number status. The 16-bit combination of the busNumber field (bits 15–6) and the NodeNumber field (bits 5–0) is referred to as the node ID. See Table 4–21 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Node identification | | | | | | | | | | | | | | | |
| Type | RU | RU | R | R | RU | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Node identification | | | | | | | | | | | | | | | |
| Type | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RU | RU | RU | RU | RU | RU |
| Default | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | X | X | X | X | X | X |

Register: **Node identification**
 Type: Read/Write/Update, Read/Update, Read-only
 Offset: E8h
 Default: 0000 FFXXh

Table 4–21. Node Identification Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|---|
| 31 | iDValid | RU | Bit 31 indicates whether or not the TSB12LV26 device has a valid node number. It is cleared when a 1394 bus reset is detected, and set to 1 when the TSB12LV26 device receives a new node number from the PHY device. |
| 30 | root | RU | Bit 30 is set to 1 during the bus reset process if the attached PHY device is root. |
| 29–28 | RSVD | R | Reserved. Bits 29 and 28 return 0s when read. |
| 27 | CPS | RU | Bit 27 is set to 1 if the PHY device is reporting that cable power status is OK. |
| 26–16 | RSVD | R | Reserved. Bits 26–16 return 0s when read. |
| 15–6 | BusNumber | RWU | This field identifies the specific 1394 bus the TSB12LV26 device belongs to when multiple 1394-compatible buses are connected via a bridge. |
| 5–0 | NodeNumber | RU | This field is the physical node number established by the PHY device during self-ID. It is automatically set to the value received from the PHY device after the self-ID phase. If the PHY device sets the NodeNumber to 63, software must not set bit 15 (run) in the asynchronous context control register (see Section 4.37, <i>Asynchronous Context Control Register</i>) for either of the AT DMA contexts. |

4.30 PHY Layer Control Register

The PHY layer control register reads or writes a PHY register. See Table 4–22 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | PHY layer control | | | | | | | | | | | | | | | |
| Type | RU | R | R | R | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | PHY layer control | | | | | | | | | | | | | | | |
| Type | RWU | RWU | R | R | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **PHY layer control**
 Type: Read/Write/Update, Read/Write, Read/Update, Read-only
 Offset: ECh
 Default: 0000 0000h

Table 4–22. PHY Layer Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|---|
| 31 | rdDone | RU | Bit 31 is cleared to 0 by the TSB12LV26 device when either bit 15 (rdReg) or bit 14 (wrReg) is set to 1. This bit is set to 1 when a register transfer is received from the PHY device. |
| 30–28 | RSVD | R | Reserved. Bits 30–28 return 0s when read. |
| 27–24 | rdAddr | RU | This field is the address of the register most recently received from the PHY device. |
| 23–16 | rdData | RU | This field is the contents of a PHY register that has been read. |
| 15 | rdReg | RWU | Bit 15 is set to 1 by software to initiate a read request to a PHY register, and is cleared by hardware when the request has been sent. Bits 14 (wrReg) and 15 (rdReg) must not both be set to 1 simultaneously. |
| 14 | wrReg | RWU | Bit 14 is set to 1 by software to initiate a write request to a PHY register, and is cleared by hardware when the request has been sent. Bits 14 (wrReg) and 15 (rdReg) must not both be set to 1 simultaneously. |
| 13–12 | RSVD | R | Reserved. Bits 13 and 12 return 0s when read. |
| 11–8 | regAddr | R/W | This field is the address of the PHY register to be written or read. |
| 7–0 | wrData | R/W | This field is the data to be written to a PHY register and is ignored for reads. |

4.31 Isochronous Cycle Timer Register

The isochronous cycle timer register indicates the current cycle number and offset. When the TSB12LV26 device is cycle master, this register is transmitted with the cycle start message. When the TSB12LV26 device is not cycle master, this register is loaded with the data field in an incoming cycle start. In the event that the cycle start message is not received, the fields can continue incrementing on their own (if programmed) to maintain a local time reference. See Table 4–23 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Isochronous cycle timer | | | | | | | | | | | | | | | |
| Type | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous cycle timer | | | | | | | | | | | | | | | |
| Type | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Isochronous cycle timer**
 Type: Read/Write/Update
 Offset: F0h
 Default: XXXX XXXXh

Table 4–23. Isochronous Cycle Timer Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|---|
| 31–25 | cycleSeconds | RWU | This field counts seconds [rollovers from bits 24–12 (cycleCount field)] modulo 128. |
| 24–12 | cycleCount | RWU | This field counts cycles [rollovers from bits 11–0 (cycleOffset field)] modulo 8000. |
| 11–0 | cycleOffset | RWU | This field counts 24.576-MHz clocks modulo 3072, that is, 125 μs. If an external 8-kHz clock configuration is being used, this field must be cleared to 0 at each tick of the external clock. |

4.32 Asynchronous Request Filter High Register

The asynchronous request filter high set/clear register enables asynchronous receive requests on a per-node basis, and handles the upper node IDs. When a packet is destined for either the physical request context or the ARRQ context, the source node ID is examined. If the bit corresponding to the node ID is not set to 1 in this register, the packet is not acknowledged and the request is not queued. The node ID comparison is done if the source node is on the same bus as the TSB12LV26 device. Nonlocal bus-sourced packets are not acknowledged unless bit 31 in this register is set to 1. See Table 4–24 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Asynchronous request filter high | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Asynchronous request filter high | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Asynchronous request filter high**
 Type: Read/Set/Clear
 Offset: 100h set register
 104h clear register
 Default: 0000 0000h

Table 4–24. Asynchronous Request Filter High Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|---|
| 31 | asynReqAllBuses | RSC | If bit 31 is set to 1, all asynchronous requests received by the TSB12LV26 device from nonlocal bus nodes are accepted. |
| 30 | asynReqResource62 | RSC | If bit 30 is set to 1 for local bus node number 62, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 29 | asynReqResource61 | RSC | If bit 29 is set to 1 for local bus node number 61, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 28 | asynReqResource60 | RSC | If bit 28 is set to 1 for local bus node number 60, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 27 | asynReqResource59 | RSC | If bit 27 is set to 1 for local bus node number 59, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 26 | asynReqResource58 | RSC | If bit 26 is set to 1 for local bus node number 58, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 25 | asynReqResource57 | RSC | If bit 25 is set to 1 for local bus node number 57, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 24 | asynReqResource56 | RSC | If bit 24 is set to 1 for local bus node number 56, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 23 | asynReqResource55 | RSC | If bit 23 is set to 1 for local bus node number 55, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 22 | asynReqResource54 | RSC | If bit 22 is set to 1 for local bus node number 54, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 21 | asynReqResource53 | RSC | If bit 21 is set to 1 for local bus node number 53, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 20 | asynReqResource52 | RSC | If bit 20 is set to 1 for local bus node number 52, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 19 | asynReqResource51 | RSC | If bit 19 is set to 1 for local bus node number 51, asynchronous requests received by the TSB12LV26 device from that node are accepted. |

Table 4–24. Asynchronous Request Filter High Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-----|-------------------|------|---|
| 18 | asynReqResource50 | RSC | If bit 18 is set to 1 for local bus node number 50, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 17 | asynReqResource49 | RSC | If bit 17 is set to 1 for local bus node number 49, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 16 | asynReqResource48 | RSC | If bit 16 is set to 1 for local bus node number 48, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 15 | asynReqResource47 | RSC | If bit 15 is set to 1 for local bus node number 47, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 14 | asynReqResource46 | RSC | If bit 14 is set to 1 for local bus node number 46, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 13 | asynReqResource45 | RSC | If bit 13 is set to 1 for local bus node number 45, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 12 | asynReqResource44 | RSC | If bit 12 is set to 1 for local bus node number 44, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 11 | asynReqResource43 | RSC | If bit 11 is set to 1 for local bus node number 43, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 10 | asynReqResource42 | RSC | If bit 10 is set to 1 for local bus node number 42, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 9 | asynReqResource41 | RSC | If bit 9 is set to 1 for local bus node number 41, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 8 | asynReqResource40 | RSC | If bit 8 is set to 1 for local bus node number 40, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 7 | asynReqResource39 | RSC | If bit 7 is set to 1 for local bus node number 39, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 6 | asynReqResource38 | RSC | If bit 6 is set to 1 for local bus node number 38, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 5 | asynReqResource37 | RSC | If bit 5 is set to 1 for local bus node number 37, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 4 | asynReqResource36 | RSC | If bit 4 is set to 1 for local bus node number 36, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 3 | asynReqResource35 | RSC | If bit 3 is set to 1 for local bus node number 35, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 2 | asynReqResource34 | RSC | If bit 2 is set to 1 for local bus node number 34, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 1 | asynReqResource33 | RSC | If bit 1 is set to 1 for local bus node number 33, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 0 | asynReqResource32 | RSC | If bit 0 is set to 1 for local bus node number 32, asynchronous requests received by the TSB12LV26 device from that node are accepted. |

4.33 Asynchronous Request Filter Low Register

The asynchronous request filter low set/clear register enables asynchronous receive requests on a per-node basis and handles the lower node IDs. Other than filtering different node IDs, this register behaves identically to the asynchronous request filter high register. See Table 4–25 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Asynchronous request filter low | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Asynchronous request filter low | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Asynchronous request filter low**
 Type: Read/Set/Clear
 Offset: 108h set register
 10Ch clear register
 Default: 0000 0000h

Table 4–25. Asynchronous Request Filter Low Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|---|
| 31 | asynReqResource31 | RSC | If bit 31 is set to 1 for local bus node number 31, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 30 | asynReqResource30 | RSC | If bit 30 is set to 1 for local bus node number 30, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 29–2 | asynReqResourcen | RSC | Bits 29 through 2 (asynReqResourcen, where n = 29, 28, 27, ..., 2) follow the same pattern as bits 31 and 30. |
| 1 | asynReqResource1 | RSC | If bit 1 is set to 1 for local bus node number 1, asynchronous requests received by the TSB12LV26 device from that node are accepted. |
| 0 | asynReqResource0 | RSC | If bit 0 is set to 1 for local bus node number 0, asynchronous requests received by the TSB12LV26 device from that node are accepted. |

4.34 Physical Request Filter High Register

The physical request filter high set/clear register enables physical receive requests on a per-node basis, and handles the upper node IDs. When a packet is destined for the physical request context, and the node ID has been compared against the ARRQ registers, then the comparison is done again with this register. If the bit corresponding to the node ID is not set to 1 in this register, the request is handled by the ARRQ context instead of the physical request context. The node ID comparison is done if the source node is on the same bus as the TSB12LV26 device. Nonlocal bus-sourced packets are not acknowledged unless bit 31 in this register is set to 1. See Table 4–26 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Physical request filter high | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Physical request filter high | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Physical request filter high**
 Type: Read/Set/Clear
 Offset: 110h set register
 114h clear register
 Default: 0000 0000h

Table 4–26. Physical Request Filter High Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-----|-------------------|------|---|
| 31 | physReqAllBusses | RSC | If bit 31 is set to 1, all physical requests received by the TSB12LV26 device from nonlocal bus nodes are accepted. |
| 30 | physReqResource62 | RSC | If bit 30 is set to 1 for local bus node number 62, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 29 | physReqResource61 | RSC | If bit 29 is set to 1 for local bus node number 61, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 28 | physReqResource60 | RSC | If bit 28 is set to 1 for local bus node number 60, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 27 | physReqResource59 | RSC | If bit 27 is set to 1 for local bus node number 59, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 26 | physReqResource58 | RSC | If bit 26 is set to 1 for local bus node number 58, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 25 | physReqResource57 | RSC | If bit 25 is set to 1 for local bus node number 57, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 24 | physReqResource56 | RSC | If bit 24 is set to 1 for local bus node number 56, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 23 | physReqResource55 | RSC | If bit 23 is set to 1 for local bus node number 55, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 22 | physReqResource54 | RSC | If bit 22 is set to 1 for local bus node number 54, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 21 | physReqResource53 | RSC | If bit 21 is set to 1 for local bus node number 53, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 20 | physReqResource52 | RSC | If bit 20 is set to 1 for local bus node number 52, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |

Table 4–26. Physical Request Filter High Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-----|-------------------|------|---|
| 19 | physReqResource51 | RSC | If bit 19 is set to 1 for local bus node number 51, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 18 | physReqResource50 | RSC | If bit 18 is set to 1 for local bus node number 50, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 17 | physReqResource49 | RSC | If bit 17 is set to 1 for local bus node number 49, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 16 | physReqResource48 | RSC | If bit 16 is set to 1 for local bus node number 48, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 15 | physReqResource47 | RSC | If bit 15 is set to 1 for local bus node number 47, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 14 | physReqResource46 | RSC | If bit 14 is set to 1 for local bus node number 46, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 13 | physReqResource45 | RSC | If bit 13 is set to 1 for local bus node number 45, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 12 | physReqResource44 | RSC | If bit 12 is set to 1 for local bus node number 44, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 11 | physReqResource43 | RSC | If bit 11 is set to 1 for local bus node number 43, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 10 | physReqResource42 | RSC | If bit 10 is set to 1 for local bus node number 42, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 9 | physReqResource41 | RSC | If bit 9 is set to 1 for local bus node number 41, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 8 | physReqResource40 | RSC | If bit 8 is set to 1 for local bus node number 40, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 7 | physReqResource39 | RSC | If bit 7 is set to 1 for local bus node number 39, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 6 | physReqResource38 | RSC | If bit 6 is set to 1 for local bus node number 38, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 5 | physReqResource37 | RSC | If bit 5 is set to 1 for local bus node number 37, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 4 | physReqResource36 | RSC | If bit 4 is set to 1 for local bus node number 36, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 3 | physReqResource35 | RSC | If bit 3 is set to 1 for local bus node number 35, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 2 | physReqResource34 | RSC | If bit 2 is set to 1 for local bus node number 34, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 1 | physReqResource33 | RSC | If bit 1 is set to 1 for local bus node number 33, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 0 | physReqResource32 | RSC | If bit 0 is set to 1 for local bus node number 32, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |

4.35 Physical Request Filter Low Register

The physical request filter low set/clear register enables physical receive requests on a per-node basis, and handles the lower node IDs. When a packet is destined for the physical request context, and the node ID has been compared against the asynchronous request filter registers, then the node ID comparison is done again with this register. If the bit corresponding to the node ID is not set to 1 in this register, the request is handled by the asynchronous request context instead of the physical request context. See Table 4–27 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Physical request filter low | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Physical request filter low | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Physical request filter low**
 Type: Read/Set/Clear
 Offset: 118h set register
 11Ch clear register
 Default: 0000 0000h

Table 4–27. Physical Request Filter Low Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|-------------------|------|---|
| 31 | physReqResource31 | RSC | If bit 31 is set to 1 for local bus node number 31, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 30 | physReqResource30 | RSC | If bit 30 is set to 1 for local bus node number 30, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 29–2 | physReqResourcen | RSC | Bits 29 through 2 (physReqResourcen, where n = 29, 28, 27, ..., 2) follow the same pattern as bits 31 and 30. |
| 1 | physReqResource1 | RSC | If bit 1 is set to 1 for local bus node number 1, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |
| 0 | physReqResource0 | RSC | If bit 0 is set to 1 for local bus node number 0, physical requests received by the TSB12LV26 device from that node are handled through the physical request context. |

4.36 Physical Upper Bound Register (Optional Register)

The physical upper bound register is an optional register and is not implemented. This register returns all 0s when read.

| | | | | | | | | | | | | | | | | |
|----------------|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Physical upper bound | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Physical upper bound | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Register: **Physical upper bound**
 Type: Read-only
 Offset: 120h
 Default: 0000 0000h

4.37 Asynchronous Context Control Register

The asynchronous context control set/clear register controls the state and indicates status of the DMA context. See Table 4–28 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|----------------|------------------------------|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| Name | Asynchronous context control | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Asynchronous context control | | | | | | | | | | | | | | | |
| Type | RSCU | R | R | RSU | RU | RU | R | R | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | X | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |

Register: **Asynchronous context control**
 Type: Read/Set/Clear/Update, Read/Set/Update, Read/Update, Read-only
 Offset: 180h set register [ATRQ]
 184h clear register [ATRQ]
 1A0h set register [ATRS]
 1A4h clear register [ATRS]
 1C0h set register [ARRQ]
 1C4h clear register [ARRQ]
 1E0h set register [ARRS]
 1E4h clear register [ARRS]
 Default: 0000 X0XXh

Table 4–28. Asynchronous Context Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------|------|--|
| 31–16 | RSVD | R | Reserved. Bits 31–16 return 0s when read. |
| 15 | run | RSCU | Bit 15 is set to 1 by software to enable descriptor processing for the context and cleared by software to stop descriptor processing. The TSB12LV26 device changes this bit only on a system (hardware) or software reset. |
| 14–13 | RSVD | R | Reserved. Bits 14 and 13 return 0s when read. |
| 12 | wake | RSU | Software sets bit 12 to 1 to cause the TSB12LV26 device to continue or resume descriptor processing. The TSB12LV26 device clears this bit on every descriptor fetch. |
| 11 | dead | RU | The TSB12LV26 device sets bit 11 to 1 when it encounters a fatal error, and clears the bit when software clears bit 15 (run). |
| 10 | active | RU | The TSB12LV26 device sets bit 10 to 1 when it is processing descriptors. |
| 9–8 | RSVD | R | Reserved. Bits 9 and 8 return 0s when read. |
| 7–5 | spd | RU | This field indicates the speed at which a packet was received or transmitted and only contains meaningful information for receive contexts. This field is encoded as: 000 = 100M bits/sec 001 = 200M bits/sec 010 = 400M bits/sec All other values are reserved. |
| 4–0 | eventcode | RU | This field holds the acknowledge sent by the link core for this packet or an internally generated error code if the packet was not transferred successfully. |

4.38 Asynchronous Context Command Pointer Register

The asynchronous context command pointer register contains a pointer to the address of the first descriptor block that the TSB12LV26 device accesses when software enables the context by setting bit 15 (run) in the asynchronous context control register (see Section 4.37) to 1. See Table 4–29 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Asynchronous context command pointer | | | | | | | | | | | | | | | |
| Type | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Asynchronous context command pointer | | | | | | | | | | | | | | | |
| Type | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU | RWU |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Asynchronous context command pointer**

Type: Read/Write/Update

Offset: 18Ch [ATRQ]

1ACh [ATRS]

1CCh [ARRQ]

1ECh [ARRS]

Default: XXXX XXXXh

Table 4–29. Asynchronous Context Command Pointer Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------|-------------------|------|--|
| 31–4 | descriptorAddress | RWU | Contains the upper 28 bits of the address of a 16-byte aligned descriptor block. |
| 3–0 | Z | RWU | Indicates the number of contiguous descriptors at the address pointed to by the descriptor address. If Z is 0, it indicates that the descriptorAddress field (bits 31–4) is not valid. |

4.39 Isochronous Transmit Context Control Register

The isochronous transmit context control set/clear register controls options, state, and status for the isochronous transmit DMA contexts. The n value in the following register addresses indicates the context number (n = 0, 1, 2, 3, ..., 7). See Table 4–30 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|----------------|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Isochronous transmit context control | | | | | | | | | | | | | | | |
| Type | RSCU | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC | RSC |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous transmit context control | | | | | | | | | | | | | | | |
| Type | RSC | R | R | RSU | RU | RU | R | R | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | X | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |

Register: **Isochronous transmit context control**
 Type: Read/Set/Clear/Update, Read/Set/Clear, Read/Set/Update, Read/Update, Read-only
 Offset: 200h + (16 * n) set register
 204h + (16 * n) clear register
 Default: XXXX X0XXh

Table 4–30. Isochronous Transmit Context Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|------------|-------------------|-------------|--|
| 31 | cycleMatchEnable | RSCU | When bit 31 is set to 1, processing occurs such that the packet described by the context first descriptor block is transmitted in the cycle whose number is specified in the cycleMatch field (bits 30–16). The cycleMatch field (bits 30–16) must match the low-order two bits of cycleSeconds and the 13-bit cycleCount field in the cycle start packet that is sent or received immediately before isochronous transmission begins. Since the isochronous transmit DMA controller may work ahead, the processing of the first descriptor block may begin slightly in advance of the actual cycle in which the first packet is transmitted. The effects of this bit, however, are impacted by the values of other bits in this register and are explained in the <i>1394 Open Host Controller Interface Specification</i> . Once the context has become active, hardware clears this bit. |
| 30–16 | cycleMatch | RSC | This field contains a 15-bit value, corresponding to the low-order two bits in the bus isochronous cycle timer register at OHCI offset F0h (see Section 4.31, <i>Isochronous Cycle Timer Register</i>) cycleSeconds field (bits 31–25) and the cycleCount field (bits 24–12). If bit 31 (cycleMatchEnable) is set to 1, this isochronous transmit DMA context becomes enabled for transmits when the low-order two bits of the bus isochronous cycle timer register cycleSeconds field (bits 31–25) and the cycleCount field (bits 24–12) value equal this field (cycleMatch) value. |
| 15 | run | RSC | Bit 15 is set to 1 by software to enable descriptor processing for the context and cleared by software to stop descriptor processing. The TSB12LV26 device changes this bit only on a system (hardware) or software reset. |
| 14–13 | RSVD | R | Reserved. Bits 14 and 13 return 0s when read. |
| 12 | wake | RSU | Software sets bit 12 to 1 to cause the TSB12LV26 device to continue or resume descriptor processing. The TSB12LV26 device clears this bit on every descriptor fetch. |
| 11 | dead | RU | The TSB12LV26 device sets bit 11 to 1 when it encounters a fatal error, and clears the bit when software clears bit 15 (run). |
| 10 | active | RU | The TSB12LV26 device sets bit 10 to 1 when it is processing descriptors. |
| 9–8 | RSVD | R | Reserved. Bits 9 and 8 return 0s when read. |
| 7–5 | spd | RU | This field is not meaningful for isochronous transmit contexts. |
| 4–0 | event code | RU | Following an OUTPUT_LAST* command, the error code is indicated in this field. Possible values are: ack_complete, evt_descriptor_read, evt_data_read, and evt_unknown. |

4.40 Isochronous Transmit Context Command Pointer Register

The isochronous transmit context command pointer register contains a pointer to the address of the first descriptor block that the TSB12LV26 device accesses when software enables an isochronous transmit context by setting bit 15 (run) in the isochronous transmit context control register (see Section 4.39, *Isochronous Transmit Context Control Register*) to 1. The n value in the following register addresses indicates the context number (n = 0, 1, 2, 3, ..., 7).

| | | | | | | | | | | | | | | | | |
|---------|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Isochronous transmit context command pointer | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous transmit context command pointer | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Isochronous transmit context command pointer**

Type: Read-only

Offset: 20Ch + (16 * n)

Default: XXXX XXXXh

4.41 Isochronous Receive Context Control Register

The isochronous receive context control set/clear register controls options, state, and status for the isochronous receive DMA contexts. The n value in the following register addresses indicates the context number (n = 0, 1, 2, 3). See Table 4–31 for a complete description of the register contents.

| | | | | | | | | | | | | | | | | |
|---------|-------------------------------------|-----|------|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Isochronous receive context control | | | | | | | | | | | | | | | |
| Type | RSC | RSC | RSCU | RSC | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous receive context control | | | | | | | | | | | | | | | |
| Type | RSCU | R | R | RSU | RU | RU | R | R | RU | RU | RU | RU | RU | RU | RU | RU |
| Default | 0 | 0 | 0 | X | 0 | 0 | 0 | 0 | X | X | X | X | X | X | X | X |

Register: **Isochronous receive context control**

Type: Read/Set/Clear/Update, Read/Set/Clear, Read/Update, Read-only

Offset: 400h + (32 * n) set register

404h + (32 * n) clear register

Default: X000 X0XXh

Table 4–31. Isochronous Receive Context Control Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-----|-------------|------|---|
| 31 | bufferFill | RSC | When bit 31 is set to 1, received packets are placed back-to-back to completely fill each receive buffer. When this bit is cleared, each received packet is placed in a single buffer. If bit 28 (multiChanMode) is set to 1, this bit must also be set to 1. The value of this bit must not be changed while bit 10 (active) or bit 15 (run) is set to 1. |
| 30 | isochHeader | RSC | When bit 30 is set to 1, received isochronous packets include the complete 4-byte isochronous packet header seen by the link layer. The end of the packet is marked with xferStatus in the first doublet, and a 16-bit timeStamp indicating the time of the most recently received (or sent) cycleStart packet. When this bit is cleared, the packet header is stripped from received isochronous packets. The packet header, if received, immediately precedes the packet payload. The value of this bit must not be changed while bit 10 (active) or bit 15 (run) is set to 1. |

Table 4–31. Isochronous Receive Context Control Register Description (Continued)

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|------------------|------|---|
| 29 | cycleMatchEnable | RSCU | When bit 29 is set to 1 and the 13-bit cycleMatch field (bits 24–12) in the isochronous receive context match register (see Section 4.43, <i>Isochronous Receive Context Match Register</i>) matches the 13-bit cycleCount field in the cycleStart packet, the context begins running. The effects of this bit, however, are impacted by the values of other bits in this register. Once the context has become active, hardware clears this bit. The value of this bit must not be changed while bit 10 (active) or bit 15 (run) is set to 1. |
| 28 | multiChanMode | RSC | When bit 28 is set to 1, the corresponding isochronous receive DMA context receives packets for all isochronous channels enabled in the isochronous receive channel mask high register at OHCI offset 70h/74h (see Section 4.19, <i>Isochronous Receive Channel Mask High Register</i>) and isochronous receive channel mask low register at OHCI offset 78h/7Ch (see Section 4.20, <i>Isochronous Receive Channel Mask Low Register</i>). The isochronous channel number specified in the isochronous receive context match register (see Section 4.43, <i>Isochronous Receive Context Match Register</i>) is ignored. When this bit is cleared, the isochronous receive DMA context receives packets for that single channel specified in the isochronous receive context match register (see Section 4.43). Only one isochronous receive DMA context may use the isochronous receive channel mask registers (see Sections 4.19 and 4.20). If more than one isochronous receive context control register has this bit set to 1, results are undefined. The value of this bit must not be changed while bit 10 (active) or bit 15 (run) is set to 1. |
| 27–16 | RSVD | R | Reserved. Bits 27–16 return 0s when read. |
| 15 | run | RSCU | Bit 15 is set to 1 by software to enable descriptor processing for the context and cleared by software to stop descriptor processing. The TSB12LV26 device changes this bit only on a system (hardware) or software reset. |
| 14–13 | RSVD | R | Reserved. Bits 14 and 13 return 0s when read. |
| 12 | wake | RSU | Software sets bit 12 to 1 to cause the TSB12LV26 device to continue or resume descriptor processing. The TSB12LV26 device clears this bit on every descriptor fetch. |
| 11 | dead | RU | The TSB12LV26 device sets bit 11 to 1 when it encounters a fatal error, and clears the bit when software clears bit 15 (run). |
| 10 | active | RU | The TSB12LV26 device sets bit 10 to 1 when it is processing descriptors. |
| 9–8 | RSVD | R | Reserved. Bits 9 and 8 return 0s when read. |
| 7–5 | spd | RU | This field indicates the speed at which the packet was received. 000 = 100M bits/sec 001 = 200M bits/sec 010 = 400M bits/sec All other values are reserved. |
| 4–0 | event code | RU | For bufferFill mode, possible values are: ack_complete, evt_descriptor_read, evt_data_write, and evt_unknown. Packets with data errors (either dataLength mismatches or dataCRC errors) and packets for which a FIFO overrun occurred are backed out. For packet-per-buffer mode, possible values are: ack_complete, ack_data_error, evt_long_packet, evt_overrun, evt_descriptor_read, evt_data_write, and evt_unknown. |

4.42 Isochronous Receive Context Command Pointer Register

The isochronous receive context command pointer register contains a pointer to the address of the first descriptor block that the TSB12LV26 device accesses when software enables an isochronous receive context by setting bit 15 (run) in the isochronous receive context control register (see Section 4.41, *Isochronous Receive Context Control Register*) to 1. The n value in the following register addresses indicates the context number (n = 0, 1, 2, 3).

| | | | | | | | | | | | | | | | | |
|----------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| Name | Isochronous receive context command pointer | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous receive context command pointer | | | | | | | | | | | | | | | |
| Type | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| Default | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Register: **Isochronous receive context command pointer**

Type: Read-only

Offset: 40Ch + (32 * n)

Default: XXXX XXXXh

4.43 Isochronous Receive Context Match Register

The isochronous receive context match register starts an isochronous receive context running on a specified cycle number, filters incoming isochronous packets based on tag values, and waits for packets with a specified sync value. The n value in the following register addresses indicates the context number (n = 0, 1, 2, 3). See Table 4–32 for a complete description of the register contents.

| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
|---------|-----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Name | Isochronous receive context match | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R | R | R | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | X | X | X | X | 0 | 0 | 0 | X | X | X | X | X | X | X | X | X |
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Name | Isochronous receive context match | | | | | | | | | | | | | | | |
| Type | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R/W | R | R/W | R/W | R/W | R/W | R/W | R/W | R/W |
| Default | X | X | X | X | X | X | X | X | 0 | X | X | X | X | X | X | X |

Register: **Isochronous receive context match**

Type: Read/Write, Read-only

Offset: 410Ch + (32 * n)

Default: XXXX XXXXh

Table 4–32. Isochronous Receive Context Match Register Description

| BIT | FIELD NAME | TYPE | DESCRIPTION |
|-------|----------------|------|---|
| 31 | tag3 | R/W | If bit 31 is set to 1, this context matches on isochronous receive packets with a tag field of 11b. |
| 30 | tag2 | R/W | If bit 30 is set to 1, this context matches on isochronous receive packets with a tag field of 10b. |
| 29 | tag1 | R/W | If bit 29 is set to 1, this context matches on isochronous receive packets with a tag field of 01b. |
| 28 | tag0 | R/W | If bit 28 is set to 1, this context matches on isochronous receive packets with a tag field of 00b. |
| 27 | RSVD | R | Reserved. Bit 27 returns 0 when read. |
| 26–12 | cycleMatch | R/W | This field contains a 15-bit value corresponding to the low-order two bits of cycleSeconds and the 13-bit cycleCount field in the cycleStart packet. If bit 29 (cycleMatchEnable) in the isochronous receive context control register (see Section 4.41, <i>Isochronous Receive Context Control Register</i>) is set to 1, this context is enabled for receives when the two low-order bits in the isochronous cycle timer register at OHCI offset F0h (see Section 4.31, <i>Isochronous Cycle Timer Register</i>) cycleSeconds field (bits 31–25) and cycleCount field (bits 24–12) value equal this field (cycleMatch) value. |
| 11–8 | sync | R/W | This 4-bit field is compared to the sync field of each isochronous packet for this channel when the command descriptor w field is set to 11b. |
| 7 | RSVD | R | Reserved. Bit 7 returns 0 when read. |
| 6 | tag1SyncFilter | R/W | If bit 6 and bit 29 (tag1) are set to 1, packets with tag 01b are accepted into the context if the two most significant bits of the packets sync field are 00b. Packets with tag values other than 01b are filtered according to bit 28 (tag0), bit 30 (tag2), and bit 31 (tag3) without any additional restrictions. If this bit is cleared, this context matches on isochronous receive packets as specified in bits 28–31 (tag0–tag3) with no additional restrictions. |
| 5–0 | channelNumber | R/W | This 6-bit field indicates the isochronous channel number for which this isochronous receive DMA context accepts packets. |

5 GPIO Interface

The general-purpose input/output (GPIO) interface consists of two GPIO ports. GPIO2 and GPIO3 power up as general-purpose inputs and are programmable via the GPIO control register. Figure 5-1 shows the logic diagram for GPIO2 and GPIO3 implementation.

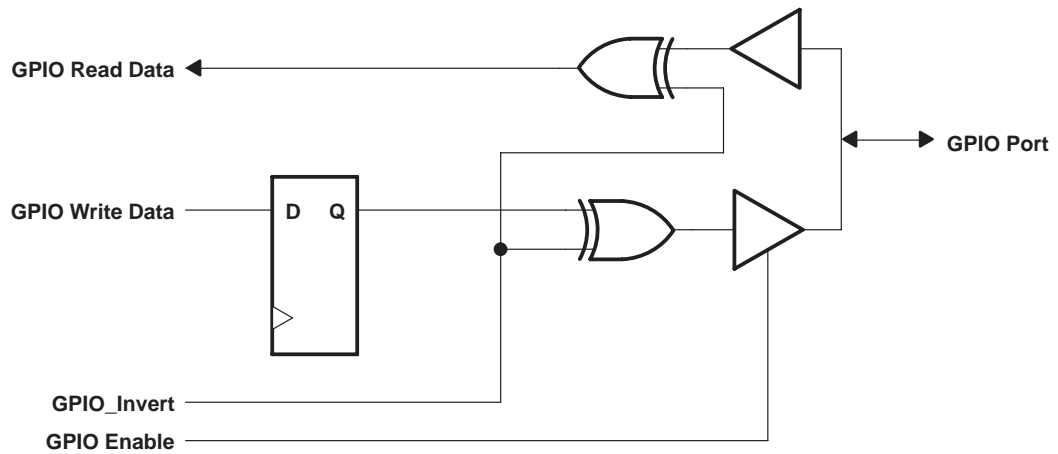


Figure 5-1. GPIO2 and GPIO3 Logic Diagram

6 Serial EEPROM Interface

The TSB12LV26 device provides a serial bus interface to initialize the 1394 global unique ID register and a few PCI configuration registers through a serial EEPROM. The TSB12LV26 device communicates with the serial EEPROM via the 2-wire serial interface.

After power up the serial interface initializes the locations listed in Table 6–1. While the TSB12LV26 device is accessing the serial EEPROM, all incoming PCI slave accesses are terminated with retry status. Table 6–2 shows the serial EEPROM memory map required for initializing the TSB12LV26 registers.

NOTE: If a ROM is implemented in the design, it must be programmed. An unprogrammed ROM defaults to all 1s, which adversely impacts device operation.

Table 6–1. Registers and Bits Loadable Through Serial EEPROM

| EEPROM OFFSET | OHCI/PCI CONFIGURATION OFFSET | REGISTER | BITS LOADED FROM EEPROM |
|---------------|-------------------------------|--|-------------------------|
| 00h | PCI register (3Eh) | PCI maximum latency, PCI minimum grant | 15–0 |
| 01h | PCI register (2Dh) | PCI vendor ID | 15–0 |
| 03h | PCI register (2Ch) | PCI subsystem ID | 15–0 |
| 05h (bit 6) | OHCI register (50h) | Host controller control | 23 |
| 05h | PCI register (F4h) | Link enhancements control | 7, 2, 1 |
| 06h–0Ah | OHCI register (24h) | GUID high | 31–0 |
| 0Bh–0Eh | OHCI register(28h) | GUID low | 31–0 |
| 10h | PCI register (F4h) | Link enhancements control | 13, 12 |
| 11h–12h | PCI register (F0h) | PCI miscellaneous | 15, 13, 10, 4–0 |
| 13h | PCI register (40h) | PCI OHCI | 0 |

Table 6–2. Serial EEPROM Map

| BYTE ADDRESS | BYTE DESCRIPTION | | | | | | | |
|--------------|---|---|------------------------------|--|--|--------------------------|-------------------------|-----------------|
| 00 | PCI maximum latency (0h) | | | | PCI minimum grant (0h) | | | |
| 01 | PCI vendor ID | | | | | | | |
| 02 | PCI vendor ID (msbyte) | | | | | | | |
| 03 | PCI subsystem ID (lsbyte) | | | | | | | |
| 04 | PCI subsystem ID | | | | | | | |
| 05 | [7] Link_enhancement- Control.enab_unfair | [6] HCControl. ProgramPhy Enable | [5–3] RSVD | [2] Link_enhancement- Control.enab_ insert_idle | [1] Link_enhancement- Control.enab_accel | [0] RSVD | | |
| 06 | Mini ROM address | | | | | | | |
| 07 | GUID high (lsbyte 0) | | | | | | | |
| 08 | GUID high (byte 1) | | | | | | | |
| 09 | GUID high (byte 2) | | | | | | | |
| 0A | GUID high (msbyte 3) | | | | | | | |
| 0B | GUID low (lsbyte 0) | | | | | | | |
| 0C | GUID low (byte 1) | | | | | | | |
| 0D | GUID low (byte 2) | | | | | | | |
| 0E | GUID low (msbyte 3) | | | | | | | |
| 0F | Checksum | | | | | | | |
| 10 | [15–14] RSVD | [13–12] AT threshold | [11–8] RSVD | | | | | |
| 11 | [7–5] RSVD | | | [4] Disable Target Abort | [3] GP2IIC | [2] Disable SCLK gate | [1] Disable PCI gate | [0] Keep PCI |
| 12 | [15] PME D3 Cold | [14] RSVD | [13] PME Support D2 | [12–11] RSVD | [10] D2 support | [9–8] RSVD | | |
| 13 | [7–1] RSVD | | | | | | [0] Global swap | |
| 14 | RSVD | | | | | | | |
| 15–1E | RSVD | | | | | | | |
| 1F | RSVD | | | | | | | |

7 Electrical Characteristics

7.1 Absolute Maximum Ratings Over Operating Temperature Ranges†

| | |
|---|---------------------------|
| Supply voltage range, V_{CC} | -0.5 V to 3.6 V |
| Supply voltage range, V_{CCP} | -0.5 V to 5.5 V |
| Input voltage range for PCI, V_I | -0.5 to $V_{CCP} + 0.5$ V |
| Input voltage range for miscellaneous and PHY interface, V_I | -0.5 to $V_{CCI} + 0.5$ V |
| Output voltage range for PCI, V_O | -0.5 to $V_{CCP} + 0.5$ V |
| Input voltage range for miscellaneous and PHY interface, V_O | -0.5 to $V_{CCP} + 0.5$ V |
| Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see Note 1) | ± 20 mA |
| Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) (see Note 2) | ± 20 mA |
| Operating free-air temperature range | -40°C to 110°C |
| Storage temperature range | -65°C to 150°C |

† Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. Applies to external input and bidirectional buffers. $V_I > V_{CCP}$.
 2. Applies to external output and bidirectional buffers. $V_O > V_{CCP}$.

7.2 Recommended Operating Conditions

| | | OPERATION | MIN | NOM | MAX | UNIT |
|------------------------------|--|----------------------------|-------|------------------------|------------------------|------|
| V _{CC} | Core voltage | 3.3 V | 3 | 3.3 | 3.6 | V |
| V _{CCP} | PCI I/O clamping voltage | 3.3 V | 3 | 3.3 | 3.6 | V |
| | | 5 V | 4.5 | 5 | 5.5 | |
| V _{IH} [†] | High-level input voltage | PCI | 3.3 V | 2 | 3.6 | V |
| | | | 5 V | 0.475 V _{CCP} | V _{CCP} | |
| | | PHY interface | | 2 | 3.6 | |
| | Miscellaneous [‡] | | 2 | V _{CCP} | | |
| V _{IL} [†] | Low-level input voltage | PCI | 3.3 V | 0 | 0.325 V _{CCP} | V |
| | | | 5 V | 0 | 0.8 | |
| | | PHY interface | | 0 | 0.8 | |
| | | Miscellaneous [‡] | | 0 | 0.8 | |
| V _I | Input voltage | PCI | 3.3 V | 0 | V _{CCP} | V |
| | | | | 0 | 3.6 | |
| | | Miscellaneous [‡] | | 0 | V _{CCP} | |
| V _O [§] | Output voltage | PCI | 3.3 V | 0 | V _{CCP} | V |
| | | | | 0 | 3.6 | |
| | | Miscellaneous [‡] | | 0 | V _{CCP} | |
| t _t | Input transition time (t _r and t _f) | PCI | | 0 | 6 | ns |
| T _A | Operating ambient temperature | | -40 | 25 | 110 | °C |

[†] Applies for external inputs and bidirectional buffers without hysteresis.

[‡] Miscellaneous terminals are: GPIO2 (2), GPIO3 (3), SDA (5), SCL (4), CYCLEOUT (77).

[§] Applies to external output buffers.

7.3 Electrical Characteristics Over Recommended Operating Conditions (unless otherwise noted)

| | | OPERATION | TEST CONDITIONS | MIN | MAX | UNIT |
|----------------------------|-------------------------------|---------------------------|----------------------------|------------------------------|----------|---------------|
| V_{OH} | High-level output voltage | PCI | $I_{OH} = -0.5 \text{ mA}$ | 0.9 V_{CC} | | V |
| | | | $I_{OH} = -2 \text{ mA}$ | 2.4 | | |
| | PHY interface | $I_{OH} = -4 \mu\text{A}$ | 2.8 | | | |
| | | $I_{OH} = -8 \text{ mA}$ | $V_{CC} - 0.6$ | | | |
| Miscellaneous [†] | $I_{OH} = -4 \text{ mA}$ | $V_{CC} - 0.6$ | | | | |
| V_{OL}^{\dagger} | Low-level output voltage | PCI | $I_{OL} = 1.5 \text{ mA}$ | 0.1 V_{CC} | | V |
| | | | $I_{OL} = 6 \text{ mA}$ | 0 | 0.55 | |
| | | PHY interface | $I_{OL} = 4 \text{ mA}$ | 0.4 | | |
| | | | $I_{OL} = 8 \text{ mA}$ | | | |
| Miscellaneous [†] | $I_{OL} = 4 \text{ mA}$ | 0.5 | | | | |
| I_{OZ} | 3-state output high-impedance | Output pins | 3.6 V | $V_O = V_{CC}$ or GND | ± 20 | μA |
| I_{IL} | Low-level input current | Input pins | 3.6 V | $V_I = \text{GND}^{\dagger}$ | ± 20 | μA |
| | | I/O pins [†] | 3.6 V | $V_I = \text{GND}^{\dagger}$ | ± 20 | |
| I_{IH} | High-level input current | PCI [†] | 3.6 V | $V_I = V_{CC}^{\dagger}$ | ± 20 | μA |
| | | Others [†] | 3.6 V | $V_I = V_{CC}^{\dagger}$ | ± 20 | |

[†] For I/O terminals, input leakage (I_{IL} and I_{IH}) includes I_{OZ} of the disabled output.

[‡] Miscellaneous terminals are: GPIO2 (2), GPIO3 (3), SDA (5), SCL (4), CYCLEOUT (77).

7.4 Switching Characteristics for PCI Interface[§]

| PARAMETER | | MEASURED | MIN | MAX | UNIT |
|-----------|-----------------------------------|-------------|-----|-----|------|
| t_{su} | Setup time before PCLK | -50% to 50% | 7 | | ns |
| t_h | Hold time before PCLK | -50% to 50% | 0 | | ns |
| t_{val} | Delay time, PHY_CLK to data valid | -50% to 50% | 2 | 11 | ns |

[§] These parameters are ensured by design.

7.5 Switching Characteristics for PHY-Link Interface[§]

| PARAMETER | | MEASURED | MIN | MAX | UNIT |
|-----------|--|-------------|-----|-----|------|
| t_{su} | Setup time, Dn, CTLn, LREQ to PHY_CLK | -50% to 50% | 6 | | ns |
| t_h | Hold time, Dn, CTLn, LREQ before PHY_CLK | -50% to 50% | 0 | | ns |
| t_d | Delay time, PHY_CLK to Dn, CTLn | -50% to 50% | 2 | 11 | ns |

[§] These parameters are ensured by design.

PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/ Ball Finish | MSL Peak Temp ⁽³⁾ | Samples (Requires Login) |
|------------------|-----------------------|--------------|-----------------|------|-------------|----------------------------|----------------------|------------------------------|-----------------------------|
| TSB12LV26TPZEP | NRND | LQFP | PZ | 100 | 90 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-3-260C-168 HR | |
| V62/03627-01XE | NRND | LQFP | PZ | 100 | 90 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-3-260C-168 HR | |

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBsolete: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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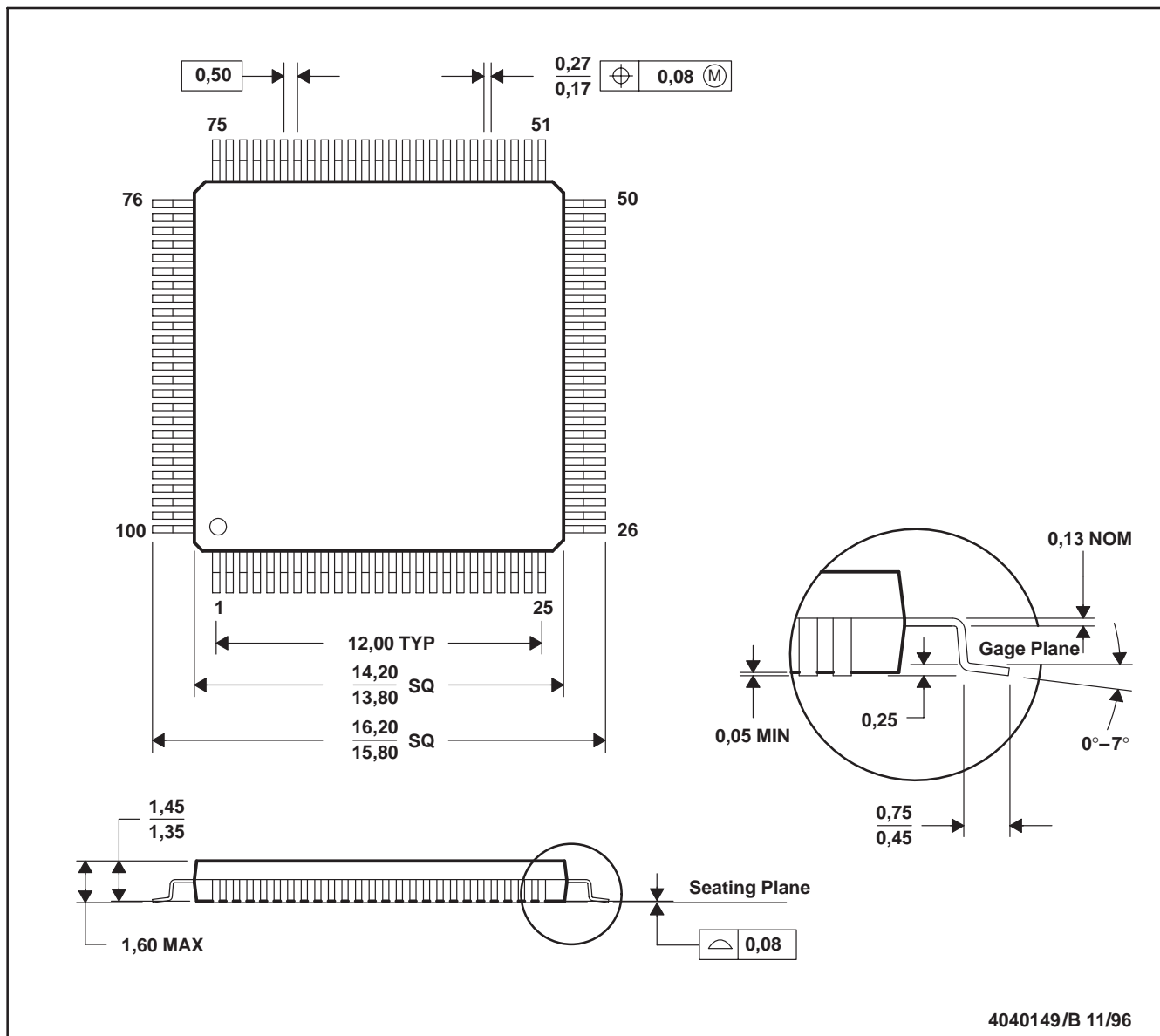
- Catalog: [TSB12LV26](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

PZ (S-PQFP-G100)

PLASTIC QUAD FLATPACK



- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Falls within JEDEC MS-026

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