

PM7385
FREEDM-84A672
REVISION B DEVICE ERRATA

ISSUE 2

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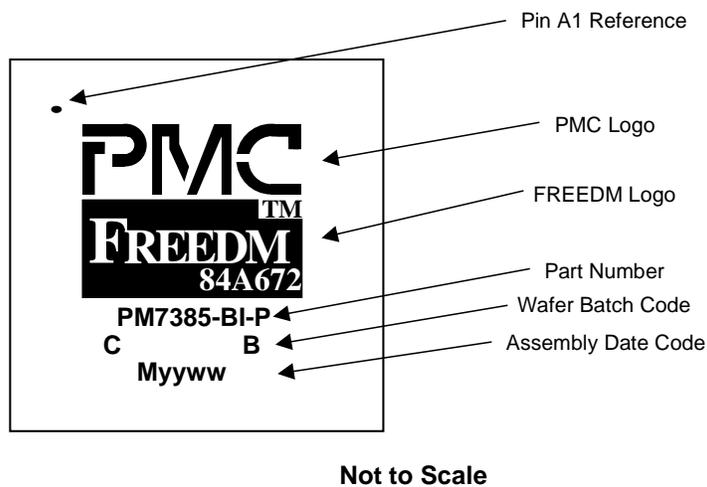
1. Introduction

In this document, Section 2 lists the known functional errata for revision B of PM7385 FREEDM-84A672 and Section 3 lists errors found in Issue 3 of the FREEDM-84A672 datasheet (PMC-1990114).

1.1. Device Identification

The information contained in Section 2 relates to Revision B of PM7385 FREEDM-84A672 only. The device revision code is marked at the end of the Wafer Batch Code on the face of the device (as shown in Figure 1.1). PM7385 FREEDM-84A672 Revision B is packaged in a 352-pin Ball Grid Array (SBGA).

Figure 1.1: PM7385 FREEDM-84A672 Branding Format.



1.2. Reference

- PMC-1990114, FREEDM-84A672 Long Form Data Sheet, Issue 3.

2. FREEDM-84A672 Revision B Functional Deficiency List

This section lists the known functional deficiencies for Revision B of FREEDM-84A672 (as of the publication date of this document). For each deficiency, the known work-around and the operating constraints, with and without the work-around, are also described.

Please report any functional deficiencies not covered in this document to PMC-Sierra.

2.1. Dropped data on unchannelised DS3 SBI SPE.

Description:

When the TCAS672 block is configured to transmit a DS-3 on one of the SBI SPE's, there is a small probability that data bytes may be dropped from the transmit data stream.

Workarounds:

Carrying out the following procedure during configuration will eliminate this problem:

1. Place the SPE into T1 mode (SBI_MODE = 1 in register 440, 444 or 448 hex)
2. Wait at least 125 us
3. Place the SPE into DS-3 mode (SBI_MODE = 0 in register 440, 444 or 448 hex)

Performance with workaround:

With the extra configuration step, FREEDM-84A672 works correctly.

Performance without workaround:

Bytes of transmit data may be dropped during transfer to the SBI bus.

2.2. TEMUX loss of frame may cause data corruption.

Description:

When a link on the TEMUX loses frame, corrupted pointer information may be sent over the SBI Bus to the FREEDM, resulting in data corruption on the FREEDM.

When frame synchronization returns, the TEMUX will automatically recover and begin transmitting data to the FREEDM. However, due to the corrupted pointer information, the FREEDM may not recover and clear the data corruption in all cases.

Workarounds:

The links, and channels, affected by the loss of framing must be unprovisioned and then reprovisioned following recover of framing synchronization on the TEMUX.

Performance with workaround:

With the affected links unprovisioned then reprovisioned after each failure, the FREEDM-84A672 works correctly.

Performance without workaround:

The affected links may experience data corruption.

2.3. Following recovery from receive FIFO overrun events, truncated data transfers may occur on the receive Any-PHY bus.

Description:

When outputting packets on the receive Any-PHY bus, the FREEDM-84A672 will normally transfer bursts of data containing $((\text{XFER}+1)*16)$ bytes, where XFER is a value between 0 and 15 configurable on a per-channel basis, or alternatively, bursts of data containing fewer bytes but including an end of packet. The Any-PHY interface is intended to operate in such a manner at all times, so that a downstream device may assume that any data transfer, in which REOP is not asserted is of a fixed length.

Following a receive FIFO overrun, however, the FREEDM-84A672 implements an automatic FIFO healing mechanism. As a consequence of this mechanism, the FREEDM-84A672 may output a burst of data containing $(n*16)$ bytes of data, where n is less than $(\text{XFER}+1)$, but which does not include an end of packet.

Workarounds:

There are 3 possible independent workarounds:

- i) Set the receive path XFER to 0. All transfers not containing an end of packet will then be 16 bytes and thus of constant length. This workaround may not be suitable in high bandwidth systems, especially if multiple FREEDM-84A672s are sharing an Any-PHY bus.
- ii) Attach a pull-down resistor to the RVAL output and monitor this signal to detect truncated data transfers.
- iii) Attach a pull-up resistor to the RERR output and monitor this signal to detect truncated data transfers. RERR is always logic 0 when the FREEDM-84A672 is outputting data on the Any-PHY bus, except when REOP is asserted. If a pull-up resistor is attached to RERR, a truncated transfer will be indicated by $\text{RERR} = 1$ and $\text{REOP} = 0$. The downstream device can take appropriate action such as discarding the packet.
- iv) Attach pull-down or pull-up resistors to the RXDATA[15:0] outputs and a pull-down resistor to the RXPRTY output. If the FREEDM-84A672 outputs a truncated burst of data and the downstream device is not monitoring RVAL and is expecting a fixed length burst of data, the downstream device will observe parity errors and can take appropriate action such as discarding the packet.

Performance with workaround:

FREEDM-84A672 operates correctly.

Performance without workaround:

The downstream device may sample invalid packet data.

2.4. Incorrect poll response on Transmit Any-PHY interface.

Description:

If an attempt is made to poll a channel on the Transmit Any-PHY Interface immediately after data has been transferred on the same channel over the Transmit Any-PHY interface, there is a small probability that an incorrect poll response may be returned.

The error may occur if data for a certain channel is transferred over the Any-PHY interface, and the same channel is polled at any time between the clock cycle after the end of the transfer and 30 SYSCLK periods later. For example, if SYSCLK is 45 MHz, the error can occur if the channel is polled between 0 and 667 ns after the end of a data transfer.

The nature of the poll response error is as follows: A response of 'space available' or 'starving' may be returned when in fact there is no space available in the transmit partial packet FIFO.

This errata item will be corrected in Revision C.

Workarounds:

A possible workaround is to avoid polling (or poll and ignore the response) channels for 30 SYSCLK cycles after data has been transferred on them. Other channels (i.e. channels whose last data transfer ended more than 30 SYSCLK cycles ago) can be polled safely.

Performance with workaround:

FREEDM-84A672 operates correctly.

Performance without workaround:

There is a small probability that an incorrect poll response of 'space' or 'starving' may be reported for a channel when in fact the transmit partial packet FIFO does not have space to accept a data transfer. If this occurs and the upstream DMA controller transfers data over the Any-PHY interface for that channel, the transmit partial packet buffer may overflow. Such an overflow may be detected via the TFOVRI interrupt bit.

3. Documentation Errors

This section lists the known documentation errors in Issue 3 of PMC-1990114 FREEDM-84A672 Datasheet (as of the publication date of this document).

Please report any documentation errors not covered in this document to PMC-Sierra.

3.1. Delay in reporting Transmit FIFO underrun events on the Any-PHY bus

Description:

The FREEDM-84A672 reports underrun events on a per-channel basis to an upstream device by setting bits TPA1[2] and/or TPA2[2] in response to a channel status poll on the Any-PHY bus. The FREEDM-84A672 documentation states that TPA_n[2] are set high in response to a poll when one or more packets have underrun on a channel since it was last polled. In fact, an underrun is not reported until a further data transfer occurs on the Transmit Any-PHY interface for the channel concerned and then that channel is next polled.”

Text Correction:

The following text in the TPA1[2] and TPA2[2] Bit Descriptions, on page 20 of the FREEDM-84A672 Data Sheet,

“ ...

When TPA_n[2] is set high, one or more packets has underrun on the channel since it was last polled.

...”

should be replaced with the following:

“ ...

TPA_n[2] is set high, when one or more packets has underrun on the channel, and a further data transfer has occurred since it was last polled.

...”

4. Contacting PMC-Sierra

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