

DW1000 Errata

Version 1.1

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DOCUMENT INFORMATION**Disclaimer**

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Caution! ESD sensitive device. Precaution should be used when handling the device in order to prevent permanent damage.

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The DW1000 or DW1000 based products, as supplied from Decawave, have not been certified for use in any particular geographic region by the appropriate regulatory body governing radio emissions in that region although it is capable of such certification depending on the region and the manner in which it is used.

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1 INTRODUCTION

This errata document details known issues with the DW1000 product. Where available workarounds are presented.

1.1 Package Marking Definitions

Package marking details for the DW1000 can be found on the top of the IC as per Figure 1.

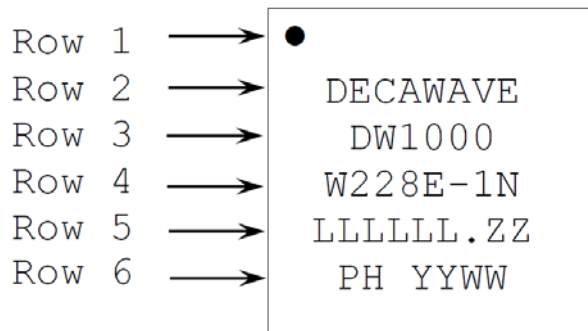


Figure 1 Device Package Markings

Row 1: Pin 1 Designator	Used for device orientation
Row 2: Company Name	DECAWAVE
Row 3: Part name	DW1000
Row 4: DW1000 part number	W228E*-1N

* DW1000 silicon revision identifier. In this example the revision of the IC is "E". **Devices marked with silicon revision identifier prior to 'E' (for example 'C') should not be used for DW1000 designs.**

Row 5: Manufacturer lot number	LLLLLL.ZZ LLLLLL is root wafer fab lot number. ZZ is the lot split number from fab.
Row 6: Package assembly information.	PH : Manufacturing Site Code YYWW : Date Code (YY =Year; WW = Week)

2 ERRATA OVERVIEW

Functional Problem	Short Description	Silicon Revision Identifier	Detailed Description
TX-1	DW1000 may fail to indicate timeout events	E	3.1
RX-1	The data in the received buffer can be corrupted if a frame is transmitted before the data is read out.	E	3.2
TX-2	Writing to the TX buffer while transmission is in progress can corrupt the data to be transmitted	E	3.3

Devices marked with silicon revision identifier prior to 'E' (for example 'C') should not be used for DW1000 designs.

3 FUNCTIONAL PROBLEMS DETAIL

3.1 TX-1

3.1.1 Introduction

For delayed transmission, the transmit time is programmed into the DW1000. One of the design objectives of delayed transmission is that the specified transmission time would be predictable and aligned with the transmit timestamp. See the section on Delayed Transmission in the DW1000 User manual.

3.1.2 Problem

A DW1000 may fail to indicate timeout events when issuing a delayed TX command under certain conditions. This could result in scheduled transmissions not completing.

When setting up delayed transmission (programming the delayed send time and then issuing the delayed transmit command), the following will happen: If the send time is imminent or the send time has passed - then the HPDWARN is flagged all the time (time NOK), as the time is increased then TXPUTE will be flagged (time TXPUTE). If the send time is far enough in the future (time OK) then no flags will be flagged and the frame is sent at the programmed time.

However, there is a window when the programmed time is greater than time TXPUTE but less than time OK at which there are no flags but the transmission does not happen. In this case there will be no TX done event generated.

3.1.3 Workaround

Check if the delayed TX has been sent in time, if there is no TX done event within the period, then issue TRXOFF and enter RX or handle as timeout.

If the TX clock is enabled (PMSC_CTRL0 bits 5,4 set to 1,0 - force TX clock on) before the delayed TX command is issued than the problem does not happen.

Further information on PMSC_CTRL0 can be found in the DW1000 user manual.

3.2 RX-1

3.2.1 Introduction

The DW1000 has a double buffered receiver allowing reception of a new frame to proceed in one buffer while the host processor is in the process of reading the last frame received into the other buffer of the buffer pair.

3.2.2 Problem

The 129th octet (i.e. buffer offset index[128]) of the second RX buffer (i.e. the one accessed when HSRBP = 1) gets corrupted when the user writes TX data at offsets greater than index 127, and issues a TX send command, before reading the received frame.

3.2.3 Workaround

There are three workaround options:

- (1) In this double buffered use case, when receiving long messages, do not send responses that fill beyond 127 octets.
- (2) Only use short messages when using double buffer mode.
- (3) Only use single buffering when using long messages (>127 bytes).

3.3 TX-2

3.3.1 Introduction

For applications that require high speed transmission the DW1000 has specific features implemented to support maximum utilisation of the transmitter.

One of the features is the fast turnaround, whereby it is possible to initiate preamble sending before writing the frame data to the TX_BUFFER or writing the frame length to the length as specified in the TFLEN and TFLE fields. See section on High Speed Transmission in the DW1000 user manual.

3.3.2 Problem

When preparing the transmission of the next frame, by writing to a part of the TX buffer which is not used for the current transmission, the new data written is written erroneously at offset 0, thus corrupting the data currently being transmitted.

The issue is that when the transmitter is enabled, the address to the TX buffer index is reset to 0.

3.3.3 Workaround

There are two workarounds:

- (1) Delay the writing of the next transmission data until the TXFRB ISR of the current transmission is triggered.
- (2) The second workaround is to carry out a dummy write of 12* bytes to location 0x3F after TXSTRT and before writing the frame data to ensure that the TX enable has asserted and reset the address before the data is written. See section TX events in the debugging application note, see APS022, debugging DW1000 based products and systems.

*Note: The number of dummy bytes to be written to location 0x3F might differ for different designs as it could depend on the LDO power up time and when the corruption of data happens.

4 DOCUMENT HISTORY

Table 1: Document History

Revision	Date	Description
1.0	8-Feb-2018	Initial release
1.1	22-Feb-2018	Logo update, added note on older silicon revisions

5 FURTHER INFORMATION

Decawave develops semiconductors solutions, software, modules, reference designs - that enable real-time, ultra-accurate, ultra-reliable local area micro-location services. Decawave's technology enables an entirely new class of easy to implement, highly secure, intelligent location functionality and services for IoT and smart consumer products and applications.

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