

Frequently Asked Questions

Title: Using Data Rate Mode in 429RTx, Rx sees only some of the transmitted labels

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Card/Board/Module: All 429RTx modules (M4K, M8K, miniPCle)

Operating System: All

Question:

I have a EXC-2000PCI board and a M4K429RTx module. I develop an application with using your source. But I have an issue about message rate.

When I use Data Rate mode with 125 bit times, only 4 (of the 5) messages are received. I could not manage to read more than 4 messages [label1, label2, ..., label5].

When I start reading, label1, label2, label3, label4 are read successfully, but not label5. When I change all msgrate from 125 to 250 then label5 is received.

Am I missing something?

Answer:

Let us examine the times of the messages.

Each message (label) is one 32-bit word.

In addition, we have 4 bit-times between messages, so we have a total of 36 bit-times for each label.

At low speed, each bit time is 80 usec (microsec), so the one word takes $80 * 36 = 2880$ usec to be transmitted.

Using data rate mode, with data rate of 125 bit-times, this means that we want to transmit the word every $80 * 125 = 10,000$ usec.

1. The algorithm used for **Data Rate mode** is as follows:

- set up all the blocks & their periodicity
- transmit the first block
- then check if the period of first block has expired and needs to be retransmitted
- if NOT, transmit next block
- then check if the period of every block from the first block on, has expired, one

at a time, and needs to be retransmitted

- if NOT, transmit the next block

Therefore, if the periods were not set up properly, it is possible that some block(s) will be transmitted multiple times, and some blocks will not be transmitted at all. So, after transmitting each block we check to see if the period of every block, that has so far been transmitted, has expired. This will happen after 10,000 usec, which is eaten up by transmitting 4 labels (each of size 2880 usec). So, at this point, instead of transmitting label #5, we go back & transmit label #1, then label #2, then label #3, then label #4, and then back again to label #1, ...

So, we will never transmit label #5.

If you use a larger data rate, of 250 bit-times, this translates to 20,000 usec, which gives enough time for all 5 labels to be transmitted, then wait about 5600 usec, and go back to transmitting the labels in sequence again. Or you could use a smaller rate, say 180 or perhaps 200, which will cover the 14,400 usec total needed by the five labels.

2. Alternatively, you can use **Interblock mode**. Its algorithm is:

- set up all blocks & their interblock gaptimes (how many bittimes to wait between transmitting this block and the next block)
- transmit each block in sequence, waiting the appropriate time in between transmission of one block & the next one
- NOTE that all blocks will be transmitted ONCE, and then we start a new round of transmitting all the blocks ONCE, etc.