



## PCI-SIG ENGINEERING CHANGE NOTICE

<b>TITLE:</b>	FC Init
<b>DATE:</b>	Dec 11, 2003; Updated 26 Mar 2004
<b>AFFECTED DOCUMENT:</b>	PCI Express Base Specification Revision 1.0a
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### **Part I**

#### **1. Summary of the Functional Changes**

This ECR proposes modifications to the FC init protocol sections of the Base Specification that clarify the requirements regarding the permitted intervals and interruptions related to the protocol.

#### **2. Benefits as a Result of the Changes**

Clarification/correction of FC Init requirements & improves implementation flexibility.

#### **3. Assessment of the Impact**

No significant negative impact. Clarifies allowance of implementation flexibility.

#### **4. Analysis of the Hardware Implications**

No significant negative impact. Clarifies allowance of implementation flexibility.

#### **5. Analysis of the Software Implications**

None.

## **Part II**

### **Detailed Description of the change**

*In Section 2.6.1. (building on errata C17):*

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- ❑ A received TLP using a VC that is not enabled is a Malformed TLP
  - VC0 is always enabled
  - For VCs 1-7, a VC is considered enabled when the corresponding VC Enable bit in the VC Resource Control Register has been set to 1b, and once FC negotiation for that VC has exited the FC\_INIT1 state and progressed to the FC\_INIT2 state (see Section 3.3)
  - This is a reported error associated with the Receiving Port (see Section 6.2)
- ❑ TLP transmission using any VC 0-7 is not permitted until initialization for that VC has completed by exiting FC\_INIT2 state

~~Note that TLP transmission for any VC should be postponed until the FC\_INIT2 state is exited, because otherwise there is a risk that the receiving component on the other side of the Link will discard the TLP on reception (VC0—see Section 2.9.1) or handle the TLP as a Malformed TLP (VCs 1-7).~~ For VCs 1-7, software must use the VC Negotiation Pending bit in the VC Resource Status Register to ensure that a VC is not used until negotiation has completed by exiting the FC\_INIT2 state in both components on a link.

In 3.3 Flow Control Initialization Protocol, edit text & delete Figure 3-3:

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The rules for this process are given in the following section. ~~Figure 3-3 shows a flowchart of the process.~~

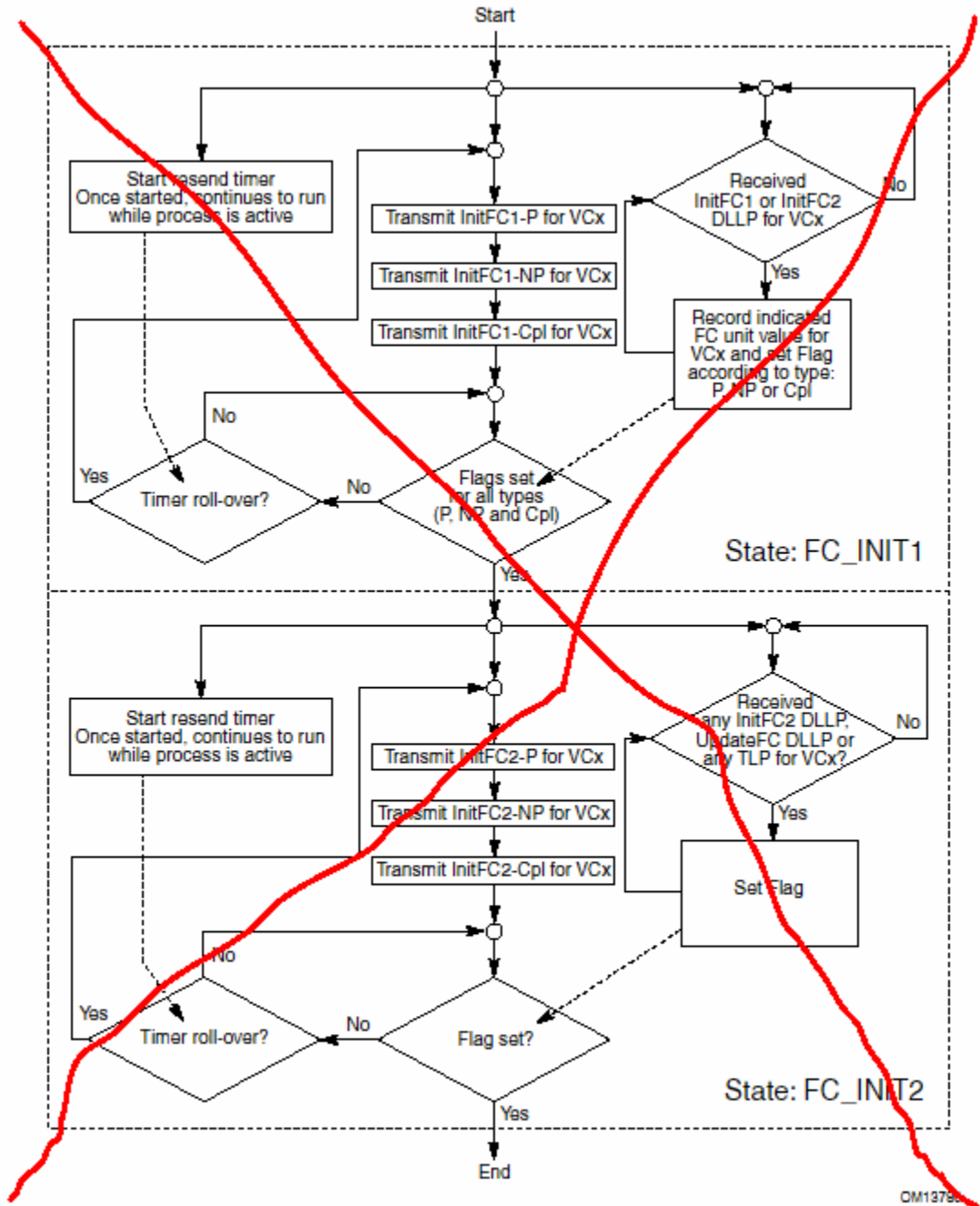


Figure 3-3: Flowchart Diagram of Flow Control Initialization Protocol

*In 3.3.1 Flow Control Initialization State Machine Rules, edit as shown:*

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- While in FC\_INIT1:
  - ◆ Transaction Layer must block transmission of TLPs using VCx
  - ◆ Transmit the following ~~uninterrupted sequence of~~ three ~~successive~~ InitFC1 DLLPs for VCx in the following relative order pattern:
    - InitFC1 – P (first)
    - InitFC1 – NP (second)
    - InitFC1 – Cpl (third)
  - ◆ ~~Repeat this InitFC1 DLLP transmission sequence as follows:~~
    - ~~For VC0, transmit continuously at the maximum rate possible on the Link (resend timer value is 0)~~
    - ~~For VCs other than VC0, repeat the sequence when no other TLPs or DLLPs are available for Transmission, but no less frequently than at an interval of 17  $\mu$ s (-0%/+100%), measured from the start of transmission of the preceding sequence~~
  - ◆ The three InitFC1 DLLPs must be transmitted at least once every 34  $\mu$ s.
    - Time spent in the Recovery LTSSM state does not contribute to this limit.
    - It is strongly encouraged that the InitFC1 DLLP transmissions are repeated frequently, particularly when there are no other TLPs or DLLPs available for transmission.
  - ◆ Except as needed to ensure ...

...

- While in FC\_INIT2:
  - ◆ Transaction Layer must block transmission of TLPs using VCx
  - ◆ Transmit the following ~~uninterrupted sequence of~~ three ~~successive~~ InitFC2 DLLPs for VCx in the following relative order pattern:
    - InitFC2 – P (first)
    - InitFC2 – NP (second)
    - InitFC2 – Cpl (third)
  - ◆ ~~Repeat this InitFC2 DLLP transmission sequence as follows:~~
    - ~~For VC0, transmit continuously at the maximum rate possible on the Link (resend timer value is 0)~~
    - ~~For VCs other than VC0, repeat the sequence when no other TLPs or DLLPs are available for Transmission, but no less frequently than at an interval of 17  $\mu$ s (-0%/+100%), measured from the start of transmission of the preceding sequence~~
  - ◆ The three InitFC2 DLLPs must be transmitted at least once every 34  $\mu$ s.

- Time spent in the Recovery LTSSM state does not contribute to this limit.
- It is strongly encouraged that the InitFC2 DLLP transmissions are repeated frequently, particularly when there are no other TLPs or DLLPs available for transmission.

◆ Except as needed to ensure ...

...

-- end of change --