To our customers,

Old Company Name in Catalogs and Other Documents

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GRADE A

MESC TECHNICAL NEWS

No.M16C-65-0011

Precautions Regarding USB Packet Size in M30240Mx-xxxFP

Classification	Concerned Products
Corrections and supplementary explnation of document ✔ Notes Knowhow Others	M30240M5/6-XXXFP

- Symptom

When there is a USB transaction in which the actual data packet size is equal to (MAXP -1) for IN or OUT transactions on any endpoint, if the next transaction is an IN (for any endpoint), then its return packet will be shortened to only one byte. If the next transaction is an OUT or a SETUP, there will be no error.

- Examples

Assume:
EP0MP = 8
EP1IMP = 64, EP1OMP = 64
EP2IMP = 16, EP2OMP = 16
EP3IMP = 8, EP3OMP = 8
EP4IMP = 8, EP4OMP = 8

Example 1:
OUT EP0 <7 bytes>
IN EP2 <1 byte> - IN FIFO has more than one byte**

Example 2:
IN EP0 <7 bytes>
IN EP2 <1 byte> - IN FIFO has more than one byte**

Example 3:
IN EP1 <63 bytes>
IN EP2 <1 byte> - IN FIFO has more than one byte**

Example 4:
OUT EP1 <63 bytes>
IN EP2 <1 byte> - IN FIFO has more than one byte**

Example 5:
IN EP2 <15 bytes>
IN EP4 <1 byte> - IN FIFO has more than one byte**

Example 6:
IN EP4 <7 bytes>
IN EP0 <1 byte> - IN FIFO has more than one byte**

** indicates an error condition.

Example 7:
IN EP0 <8 bytes>
IN EP4 <Correct packet size>

Example 8:
OUT EP1 <64 bytes>
IN EP0 <Correct packet size>

Example 9:
IN EP0 <6 bytes>
IN EP4 <Correct packet size>

Example 10:
OUT EP1 <60 bytes>
IN EP0 <Correct packet size>

Example 11:
IN EP1 <63 bytes> - packet size = (MAXP -1)
OUT EP4 <8 bytes>
IN EP3 <Correct packet size>

Example 12:
OUT EP1 <63 bytes> - packet size = (MAXP -1)
SETUP <8 bytes>
IN EP0 <Correct packet size>

- Impact to the User

This design error could affect the user's application. Users should use the following checklist to examine whether this error could affect their application.

Checklist:
(if a particular transfer type does not apply to the application, skip that check number)

1. Control Transfer (standard/class/vendor):
   Are there any data packets where the size is (MAXP -1)?
   YES ( ) NO ( )

   If the answer is NO, go to check # 2.

   If the answer is YES, set EP0MP = 0xFF, but still use the applications real maximum packet size (8 or 16 or 32) as bMaxPacketSize0 when reporting a device descriptor - this avoids the packet size = (MAXP -1) condition. Go to check # 2.

   Note:
   In this setting, FORCE_STALL bit may not be set when the host sends a packet that is larger than bMaxPacketSize0.

2. Interrupt Transfer:
   Are there any data packets where the size is (MAXP -1)?
   YES ( ) NO ( )

   If the answer is NO, go to check # 3.

   If the answer is YES, set EPiIMP/EPiOMP = 0xFF, but still use the applications real maximum packet size as wMaxPacketSize when reporting an endpoint descriptor - this avoids the packet size = (MAXP -1) condition. Go to check # 3.

   Note:
   - In this setting, the IN/OUT FIFO is in single buffer mode.
   - In this setting, EPiIMP/EPiOMP (0xFF) differs from wMaxPacketSize. Therefore the AUTO_SET/AUTO_CLR function should not be used.
   - In this setting, the FORCE_STALL bit may not be set when the host sends a packet that is larger than wMaxPacketSize.

3. Isochronous Transfer:
   Are there any data packets where the size is (MAXP -1)?
   YES ( ) NO ( )

   If the answer is NO, go to check # 4.

   If the answer is YES, always set EPiIMP/EPiOMP = 1/2 FIFO size, but still use the applications real maximum packet size as wMaxPacketSize when reporting an endpoint descriptor. Is this setting (EPiIMP/EPiOMP = 1/2 FIFO size) sufficient to avoid the packet size = (MAXP -1) condition?

   If the answer is YES, go to check # 4.

   Note:
   - In this setting, the IN/OUT FIFO is in double buffer mode.
   - AUTO_SET/AUTO_CLR function is available only when the actual packet size = 1/2 FIFO size. In other condition, AUTO_SET/AUTO_CLR function should not be used.

   If the answer is NO — You have a POTENTIAL problem (contact Technical Support for further help).

4. Bulk Transfer: (This transfer type only needs to examine the last packet of the transfer).
   Is the last data packet size = (MAXP -1)?
   YES ( ) NO ( )

   If the answer is NO, you are done with the checklist - this design error does not affect the application.

   If the answer is YES, Is it possible to use either one of the following settings?

   (1) set EPiIMP/EPiOMP = 0xFF, but still use the applications real maximum packet size as wMaxPacketSize when reporting an endpoint descriptor

   Note:
   - In this setting, the IN/OUT FIFO is in single buffer mode.
   - In this setting, EPiIMP/EPiOMP (0xFF) differs from wMaxPacketSize. Therefore the AUTO_SET/AUTO_CLR function should not be used.
   - In this setting, the FORCE_STALL bit may not be set when the host sends a packet that is larger than wMaxPacketSize.

   (2) make a bulk transfer(OUT and IN) with the total size an even number

   If the answer is YES, you are done with the checklist - this design error does not affect the application. If the answer is NO — You have a POTENTIAL problem (contact Technical Support for further help).