OKI 16-bit MICROCONTROLLER INFORMATION

Subject:
　This shows the notice for using ML66525A-xxTB (Mask ROM version) or ML66Q525A-NTB (Flash ROM version).
　The description of UDCKEN bit of P5IO register (P13-3 on ML66525 Family User's Manual) is not enough.
　Below correct the description of UDCKEN bit.

1. Description of UDCKEN bit
　UDCKEN bit select clock supply for internal DMA control function.
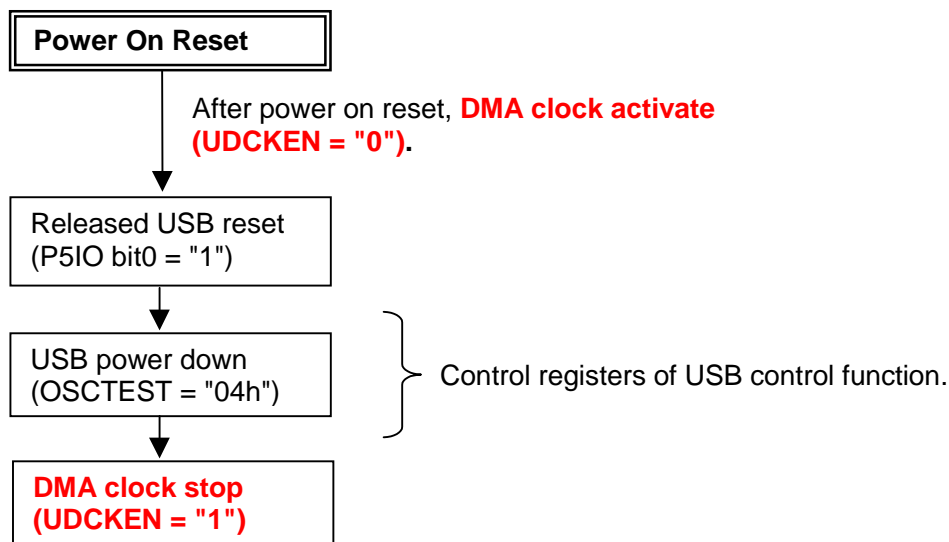　In case of setting as UDCKEN="0"(DMA clock supply), internal DMA control function is operation.
　In case of setting as UDCKEN="1"(DMA clock stop), internal DMA control function stop operation and
　CPU can not control USB control function registers (P17-20 and 17-21 on ML66525 Family User's Manual).
　When CPU control USB control function registers, UDCKEN bit must be clear (UDCKEN="0").
　Below show the control example when need to control USB control function registers at power on reset, start USB communication, and stop USB communication.

2. Control example of USB control function register with UDCKEN bit

　2-1. In case of "Power On Reset"
　　To stop operation of USB & Internal DMA control function, CPU control USB control function registers before "DMA clock stop".

```
┌─────────────────────┐
│  Power On Reset     │
└─────────────────────┘
          │
          │   After power on reset, DMA clock activate
          │   (UDCKEN = "0").
          ▼
┌─────────────────────┐
│ Released USB reset  │
│ (P5IO bit0 = "1")   │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐        ┐
│ USB power down      │        │  Control registers of USB control function.
│ (OSCTEST = "04h")   │        ┘
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ DMA clock stop      │
│ (UDCKEN = "1")      │
└─────────────────────┘
```

2-2. In case of "Start USB Communication"
    To start operation of USB & Internal DMA control function, CPU control USB control function registers after "DMA clock activate".

```
┌─────────────────────────────┐
│  USB Cable Connection        │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ USB reset                    │
│ (P5IO bit0 = "0" -> "1")     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ DMA clock activate           │
│ (UDCKEN = "0")               │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐          ⎫
│ USB control function         │          ⎬
│ initialization               │          │
└─────────────────────────────┘          │  Control registers of USB control function.
              │                           │
              ▼                           │
┌─────────────────────────────┐          │
│ D+ pull-up on                │          │
│ (SYSCON bit3 = "1")          │          ⎭
└─────────────────────────────┘
```
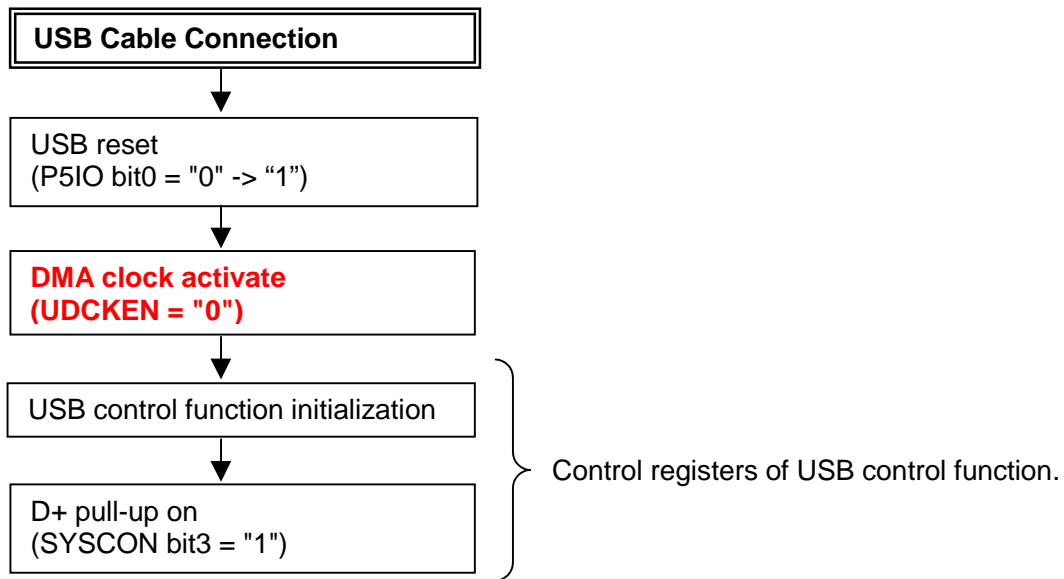
2-3. In case of "Stop USB Communication"
    To stop operation of USB & Internal DMA control function, CPU control USB control function registers before "DMA clock stop".

```
┌─────────────────────────────┐
│  USB Cable Disconnection     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐          ⎫
│ D+ pull-up off               │          ⎬
│ (SYSCON bit3 = "0")          │          │
└─────────────────────────────┘          │  Control registers of USB control function.
              │                           │
              ▼                           │
┌─────────────────────────────┐          │
│ USB power down               │          │
│ (OSCTEST = "04h")            │          ⎭
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ DMA clock stop               │
│ (UDCKEN = "1")               │
└─────────────────────────────┘
```