

# CX-AM335x LED 제어 안되는 문제

<http://www.mangoboard.com/>

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Crazy Embedded Laboratory

# Document History

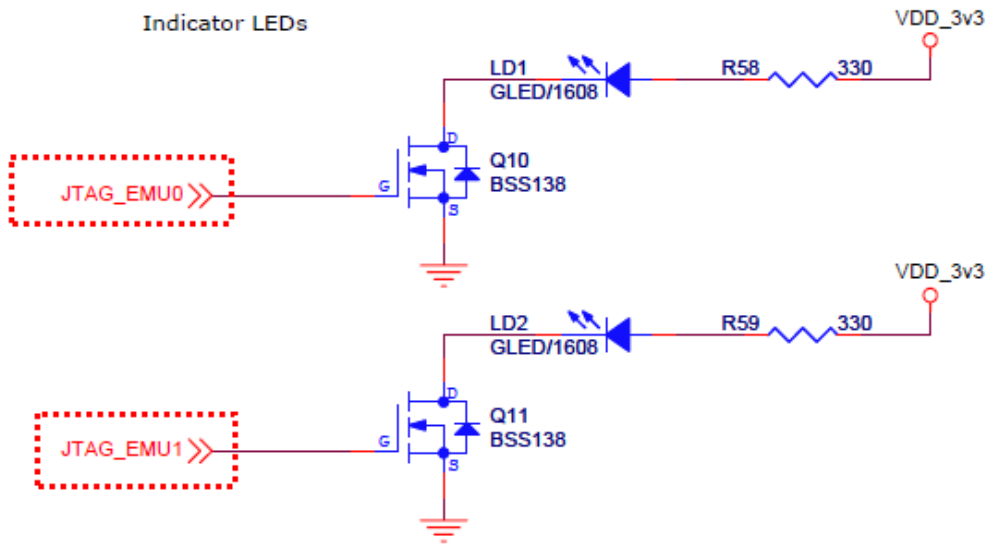
| Revision | Date       | Change note |
|----------|------------|-------------|
| Init     | 2016-07-01 | 전종인         |
|          |            |             |

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# 1. 문제점

LED가 제어가 되지 않고, 항상 켜져 있음.

## Indicator LEDs



JTAG\_EMU0 <-> GPIO3\_7

JTAG\_EMU1 <-> GPIO3\_8

JTAG\_EMU0 <-> GPIO3\_7 (LED1 제어 방법)

```
echo 103 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio103/direction
echo 1 > /sys/class/gpio/gpio103/value
echo 0 > /sys/class/gpio/gpio103/value
```

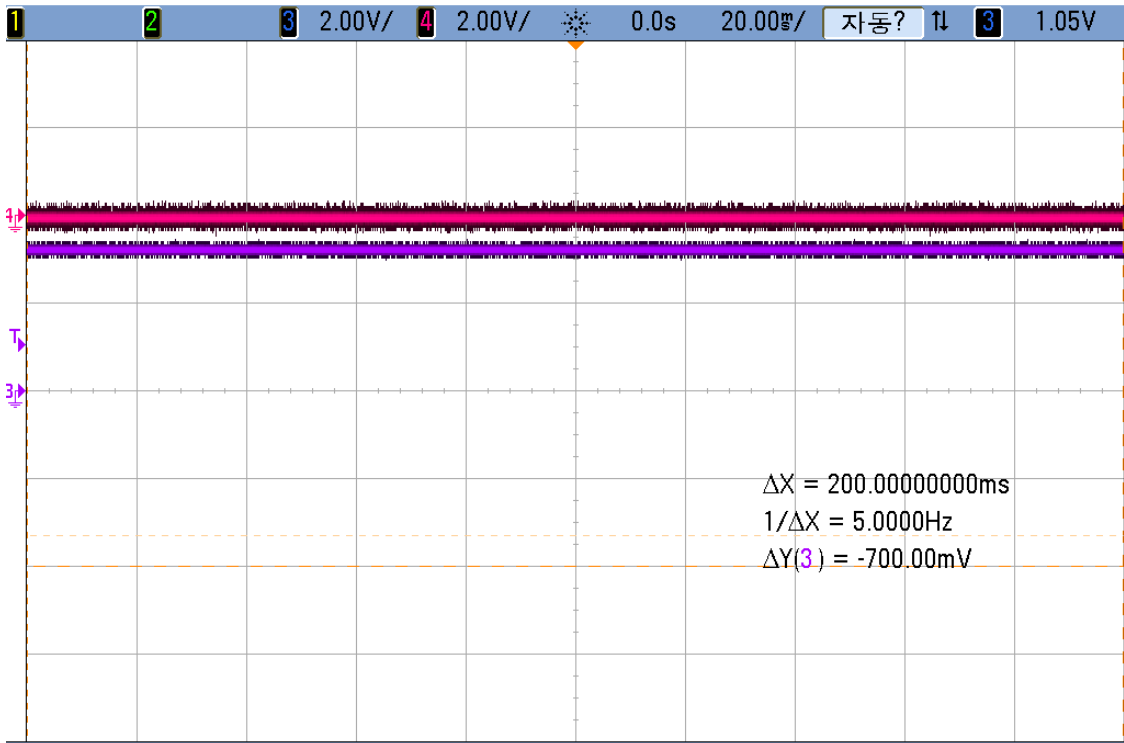
JTAG\_EMU1 <-> GPIO3\_8 (LED1 제어 방법)

```
echo 104 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio104/direction
```

```
echo 1 > /sys/class/gpio/gpio104/value
echo 0 > /sys/class/gpio/gpio104/value
```

제어가 되지 않음  
항상 High로 유지함.

3번 보라색 : Q10 부품 G, 4번 분홍색 : Q10 부품 D



## 2. 원인 분석

|                           |  |
|---------------------------|--|
| <b>Advisory 1.0.36</b>    | <b><i>EMU0 and EMU1: Terminals Must be Pulled High Before ICEPick Samples</i></b>  |
| <b>Revisions Affected</b> | 2.1, 2.0, 1.0  |
| <b>Details</b>            | <p>The state of the EMU[1:0] terminals are latched during reset to determine ICEPick boot mode. For normal device operation, these terminals must be pulled up to a valid high logic level (<math>&gt; V_{IH}</math> min) before ICEPick samples the state of these terminals, which occurs [five CLK_M_OSC clock cycles - 10 ns] after the falling edge of WARMRSTn.</p> <p>Many applications may not require the secondary GPIO function of the EMU[1:0] terminals. In this case, they would only be connected to pull-up resistors, which ensures they are always high when ICEPick samples. However, some applications may need to use these terminals as GPIO where they could be driven low before reset is asserted. This usage of the EMU[1:0] terminals may require special attention to ensure the terminals are allowed to return to a valid high-logic level before ICEPick samples the state of these terminals.</p> <p>When any device reset is asserted, the pin mux mode of EMU[1:0] terminals configured to operate as GPIO (mode 7) will change back to EMU input (mode 0) on the falling edge of WARMRSTn. This only provides a short period of time for the terminals to return high if driven low before reset is asserted.</p> |
| <b>Workaround</b>         | <p>If the secondary GPIO function of the EMU[1:0] terminals is not required, only connect these terminals to pull-up resistors.</p> <p>If the EMU[1:0] terminals are configured to operate as GPIO, the product should be designed such these terminals can be pulled to a valid high-logic level within 190 ns after the falling edge of WARMRSTn.</p>  |

EMU[1:0] 는 WARMRSTn 신호가 Falling edge후에 190ns 안에 high가 되도록 디자인 되어야 된다고 되어 있습니다.

### 3. 수정 방법

수정내용

"arch/arm/mach-omap2/board-am335xevm.c"

```
static struct pinmux_config lcd_power[] = {
    {"gpmc_csn2.gpio1_31",OMAP_MUX_MODE7 | AM33XX_PIN_OUTPUT},
    {"gpmc_csn3.gpio2_0", OMAP_MUX_MODE7 |AM33XX_PIN_OUTPUT },
    //CRZ_icanjji crazyboys 20160701 LED control
    {"emu0.gpio3_7", OMAP_MUX_MODE7 |AM33XX_PIN_OUTPUT },
    {"emu1.gpio3_8", OMAP_MUX_MODE7 |AM33XX_PIN_OUTPUT },
    {NULL, 0},
};
```

수정 후 아래와 같이 제어하면 제어가 됩니다.

JTAG\_EMU0 <-> GPIO3\_7 (LED1 제어 방법)

```
echo 103 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio103/direction
echo 1 > /sys/class/gpio/gpio103/value
echo 0 > /sys/class/gpio/gpio103/value
```

JTAG\_EMU1 <-> GPIO3\_8 (LED1 제어 방법)

```
echo 104 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio104/direction
echo 1 > /sys/class/gpio/gpio104/value
echo 0 > /sys/class/gpio/gpio104/value
```

확인 방법

```
cat /sys/kernel/debug/gpio
cat /sys/kernel/debug/omap_mux/emu0
cat /sys/kernel/debug/omap_mux/emu1
```

OUTPUT으로 설정이 되어 있습니다.

```
[root@localhost ~]# cat /sys/kernel/debug/omap_mux/emu0
name: emu0.gpio3_7 (0x44e109e4/0x9e4 = 0x0007), b NA, t NA
mode: OMAP_MUX_MODE7 | AM33XX_PIN_OUTPUT
signals: emu0 | NA | NA | NA | NA | NA | NA | gpio3_7
```

```
[root@localhost ~]# cat /sys/kernel/debug/omap_mux/emu1
name: emu1.gpio3_8 (0x44e109e8/0x9e8 = 0x0007), b NA, t NA
mode: OMAP_MUX_MODE7 | AM33XX_PIN_OUTPUT
signals: emu1 | NA | NA | NA | NA | NA | NA | gpio3_8
```