Mango-IMX6Q 7 인치 감압식 LCD 터치 구동하기

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Document History

Revision	Date	Change note
Init	2016-05-12	전종인

1. Mango-IMX6 7인치 감압식 LCD 터치 구동하기

1.1. Mango-IMX6Q 1.2 버전

<1.2버전 보드>
이미지를 다운로드 받는다

```
$ wget http://crztech.iptime.org:8080/Release/mango-imx6q/linux/kernel-3.10.53/20160216/mango-imx6q-image-160216.tgz
```

```
$tar xf mango-imx6q-image-160216.tgz
```

```
$ cd image
$ cp imx6q-sabresd-tsc2007.dtb imx6q-sabresd.dtb
```

1.2. Mango-IMX6Q 1.3 버전

<1.3 버전 보드>
커널 소스 수정
LCD Back Light GPIO : SD1_DAT2(GPIO1_19, PWM2)

SD1_DAT2	ALT0	SD1_DATA2	HYS - ENABLED	SW_PAD_CTL_PAD_SD1_DATA2
	ALT1	ECSPI5_SS1	PUS - 100K_OHM_PU	
	ALT2	GPT_COMPARE2	PUE - PULL	
	ALT3	PWM2_OUT	PKE - ENABLED	
	ALT4	WDOG1_B		

Table continues on the next page...

Table 4-1. Pin Assignments (continued)

Pad Name	Mode	Signal	Pad Settings	Pad/Group Registers
	ALT5	GPIO1_IO19	ODE - DISABLED	
	ALT6	WDOG1_RESET_B_DEB	SPEED - MEDIUM	
			DSE - 40_OHM	
			SRE - SLOW	

LCD Power EN GPIO: ENET_TXD0 (GPIO1_30)

ENET_TXD0	ALT1	ENET_TX_DATA0	
	ALT2	ESAI_TX4_RX1	
	ALT5	GPIO1_IO30	

arch/arm/boot/dts/imx6qdl-sabresd.dtㄴㅏ

```
        lcd@0 {
                compatible = "fsl,lcd";
```

```
                ipu_id = <0>;
                disp_id = <0>;
                default_ifmt = "BGR24";
                pinctrl-names = "default";
                pinctrl-0 = <&pinctrl_ipu1_1>;
                power_en_gpio = <&gpio1 30 0>; /* Power EN */
                backlight_ctl_gpio = <&gpio1 19 0>; /* Backlight   CTRL */
                status = "okay";
        };

        pwm-backlight {
                compatible = "pwm-backlight";
                pwms = <&pwm2 0 50000>;
                brightness-levels = <
                        0  /*1  2  3  4  5  6*/  7  8  9
                        10 11 12 13 14 15 16 17 18 19
                        20 21 22 23 24 25 26 27 28 29
                        30 31 32 33 34 35 36 37 38 39
                        40 41 42 43 44 45 46 47 48 49
                        50 51 52 53 54 55 56 57 58 59
                        60 61 62 63 64 65 66 67 68 69
                        70 71 72 73 74 75 76 77 78 79
                        80 81 82 83 84 85 86 87 88 89
                        90 91 92 93 94 95 96 97 98 99
                        100
                        >;
                default-brightness-level = <94>;
        };

&pwm1 {
        pinctrl-names = "default";
        pinctrl-0 = <&pinctrl_pwm1_1>;
        status = "disabled";
};

&pwm2 {
        pinctrl-names = "default";
        pinctrl-0 = <&pinctrl_pwm2_1>;
```

```
            status = "okay";
};



#if 0
            mango-ts@38 {
                        compatible = "mango,mango-ts";
                reg = <0x38>;
                pinctrl-names = "default";
                pinctrl-0 = <&pinctrl_mango_ts>;
                interrupt-parent = <&gpio3>;
                interrupts = <26 0>;
                        resets = <&mango_ts_reset>;
            };
#else
    touchscreen: tsc2007@4a {
        compatible = "ti,tsc2007";
        reg = <0x4a>;
            pinctrl-names = "default";
            pinctrl-0 = <&pinctrl_mango_ts>;
        interrupt-parent = <&gpio3>;
        interrupts = <26 0>;
        gpios = <&gpio3 26 GPIO_ACTIVE_LOW>;
        ti,x-plate-ohms = <660>;
        linux,wakeup;
    };
#endif
```

arch/arm/boot/dts/imx6qdl.dtsi 파일 수정

```
            pwm2 {
                        pinctrl_pwm2_1: pwm2grp-1 {
                        fsl,pins = <
                                                MX6QDL_PAD_SD1_DAT2__PWM2_OUT 0x1b0b1
                                >;
                        };
            };
```

수정을 합니다.

커널을 컴파일 합니다.

```
$ ./build_kernel
```

SD card Linux PC에 삽입 후 Write를 합니다.

```
 [icanjji@icanjji-Samsung-DeskTop-System image]$ dmesg | tail
[9858808.684792] usb 2-1.4: new full-speed USB device number 7 using ehci_hcd
[9858808.779530] cp210x 2-1.4:1.0: cp210x converter detected
[9858808.852309] usb 2-1.4: reset full-speed USB device number 7 using ehci_hcd
[9858808.945045] usb 2-1.4: cp210x converter now attached to ttyUSB0
[9906472.618868] sd 184:0:0:0: [sdg] 15628288 512-byte logical blocks: (8.00 GB/7.45 GiB)
[9906472.620360] sd 184:0:0:0: [sdg] No Caching mode page present
[9906472.620364] sd 184:0:0:0: [sdg] Assuming drive cache: write through
[9906472.622477] sd 184:0:0:0: [sdg] No Caching mode page present
[9906472.622481] sd 184:0:0:0: [sdg] Assuming drive cache: write through
[9906472.623242]  sdg: sdg1
```

1.3. 이미지 Write 방법

u-boot, kernel, 파일 시스템 모두 Write 방법

```
$ sudo ./sdwriter sdg imx6q
```

u-boot와 커널, dtb 파일만 Write 방법

```
$ sudo ./sdwriter sdg imx6q bin
```

1.4. 테스트 방법

Micro SD Card를 보드에 삽입
부팅 스위치
SW1 : 2번 ON , 나머지 OFF
SW2: 3,4,5 ON , 나머지 OFF

전원을 인가 합니다.

Debug 터미널 창에서 아무키나 누른 후 설정을 합니다.

```
U-Boot 2014.04-08648-g9d7bf9b-dirty (Jan 20 2016 - 17:47:14)

CPU:   Freescale i.MX6Q rev1.5 at 792 MHz
CPU:   Temperature 25 C, calibration data: 0x5484b969
Reset cause: POR
Board: MX6-SabreSD
I2C:   ready
DRAM:  2 GiB
MMC:   FSL_SDHC: 0, FSL_SDHC: 1, FSL_SDHC: 2
*** Warning - bad CRC, using default environment

Display: Mango-AT070 (800x480)
In:    serial
Out:   serial
Err:   serial
mmc2 is current device
unsupported boot devices
check_and_clean: reg 0, flag_set 0
Fastboot: Normal
SATA isn't buildin
Net:   FEC [PRIME]
Warning: failed to set MAC address

Normal Boot
Hit any key to stop autoboot:  0
=>
=>
=>
=>
=> setenv mmcargs 'setenv bootargs console=${console},${baudrate} ${smp} root=${mmcroot}
video=mxcfb0:dev=lcd,MANGO-PRESS7,fbpix=BGR32,bpp=32'
=> save
Saving Environment to MMC...
Writing to MMC(2)... done
=> reset
```

```
setenv mmcargs 'setenv bootargs console=${console},${baudrate} ${smp} root=${mmcroot} video=mxcfb0:dev=lcd,MANGO-PRESS7,fbpix=BGR32,bpp=32'
```

커널 부팅 메시지에 아래와 같이 출력이 되면 인식이 된 것입니다.

```
input: TSC2007 Touchscreen as /devices/soc0/soc.1/2100000.aips-bus/21a4000.i2c/i2c-1/1-004a/input/input0
i2c-core: driver [mango-ts] using legacy suspend method
i2c-core: driver [mango-ts] using legacy resume method
i2c-core: driver [isl29023] using legacy suspend method
i2c-core: driver [isl29023] using legacy resume method
```

테스트 명령

```
ts_calibrate
ts_test
```