

I.MX93-EVK-PWM_LED

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PUBLIC



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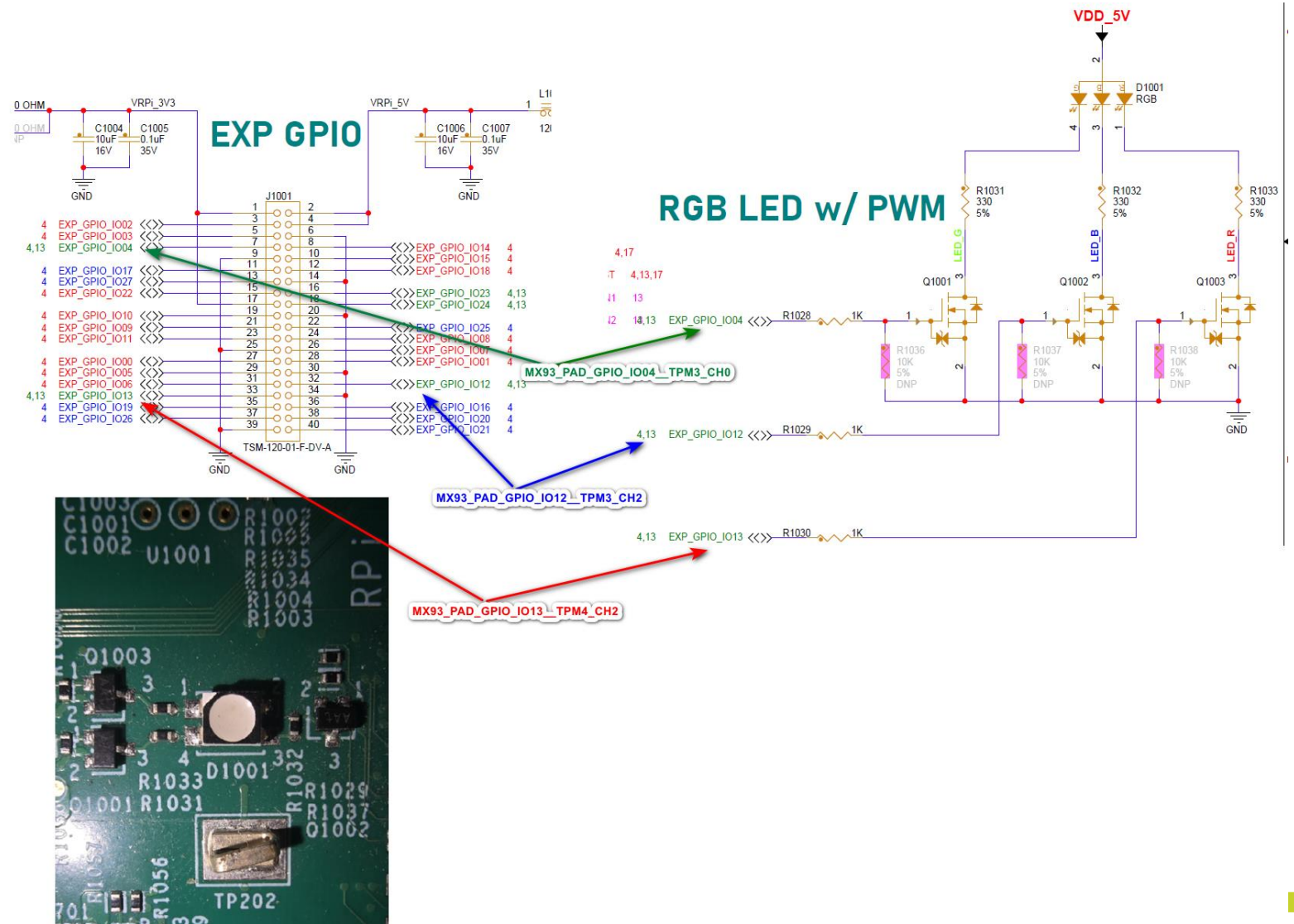
iMX93-EVK-PWM_LED

HW: iMX93 11x11 EVK

SW: If-6.6.3-1.0.0

PWM: TPM3 CH0, CH2
TPM4 CH2

Note: The i.MX PWM and PWM led are already enabled in If-6.6.3-1.0.0



Device Tree Changes

imx93-11x11-evk-pwm.dts

```
// SPDX-License-Identifier: (GPL-2.0+ OR MIT)
```

```
/*  
 * Copyright 2022 NXP  
 */
```

```
#include <dt-bindings/leds/common.h>  
#include "imx93-11x11-evk.dts"
```

```
&tpm3 {  
    pinctrl-names = "default";  
    pinctrl-0 = <&pinctrl_tpm3>;  
    status = "okay";  
};  
  
&tpm4 {  
    pinctrl-names = "default";  
    pinctrl-0 = <&pinctrl_tpm4>;  
    status = "okay";  
};  
&iomuxc {  
  
    pinctrl_tpm3: tpm3grp {  
        fsl,pins = <  
            MX93_PAD_GPIO_IO04__TPM3_CH0    0x19e  
            MX93_PAD_GPIO_IO12__TPM3_CH2    0x19e  
        >;  
    };  
    pinctrl_tpm4: tpm4grp {  
        fsl,pins = <  
            MX93_PAD_GPIO_IO13__TPM4_CH2    0x19e  
        >;  
    };  
};
```

imx93-11x11-evk-pwm-led.dts

```
// SPDX-License-Identifier: (GPL-2.0+ OR MIT)
```

```
/*  
 * Copyright 2022 NXP  
 */
```

```
#include <dt-bindings/leds/common.h>  
#include "imx93-11x11-evk-pwm.dts"  
/ {
```

```
    leds {  
        compatible = "pwm-leds";  
  
        led-g {  
            label = "Green::TPM3_CH0";  
            color = <LED_COLOR_ID_GREEN>;  
            pwms = <&tpm3 0 5000000 0>;  
            max-brightness = <255>;  
        };  
  
        led-b {  
            label = "Blue::TPM3_CH2";  
            color = <LED_COLOR_ID_BLUE>;  
            pwms = <&tpm3 2 5000000 0>;  
            max-brightness = <255>;  
        };  
  
        led-r {  
            label = "Red::TPM4_CH2";  
            pwms = <&tpm4 2 5000000 0>;  
            color = <LED_COLOR_ID_RED>;  
            max-brightness = <255>;  
        };  
    };  
};
```



Test PWM

Check which one is i.MX93 pwm

In this case, they are pwm0 and pwm4

```
for i in /sys/class/pwm/* ; do echo $i; cat $i/device/of_node/name ; echo; cat $i/device/modalias ; echo; echo; done
```

```
/sys/class/pwm/pwmchip0
```

```
pwm
```

```
of:NpwmT(null)Cfsl,imx7ulp-pwm
```

```
/sys/class/pwm/pwmchip4
```

```
pwm
```

```
of:NpwmT(null)Cfsl,imx7ulp-pwm
```

```
/sys/class/pwm/pwmchip8
```

```
pwm-adp5585
```

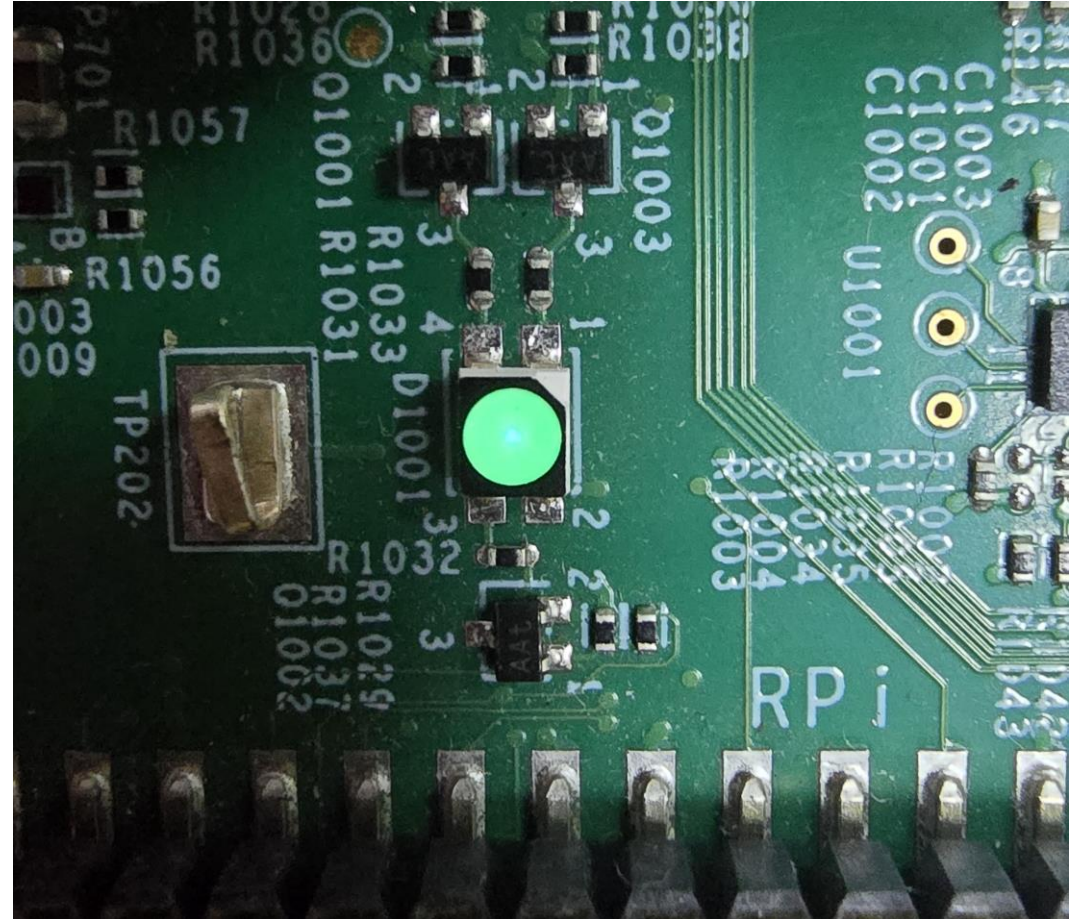
```
of:Npwm-adp5585T(null)Cadp5585-pwm
```

Test PWM (Cont.)

Using imx93-11x11-evk-pwm.dtb compiled from imx93-11x11-evk-pwm.dts

Green(MX93_PAD_GPIO_IO04__TPM3_CH0)

```
echo 0 > /sys/class/pwm/pwmchip0/export  
echo 5000000 > /sys/class/pwm/pwmchip0/pwm0/period  
echo 1000000 >  
/sys/class/pwm/pwmchip0/pwm0/duty_cycle  
echo 1 > /sys/class/pwm/pwmchip0/pwm0/enable  
  
echo 0 > /sys/class/pwm/pwmchip0/pwm0/enable  
  
echo 1000 > /sys/class/pwm/pwmchip0/pwm0/duty_cycle
```



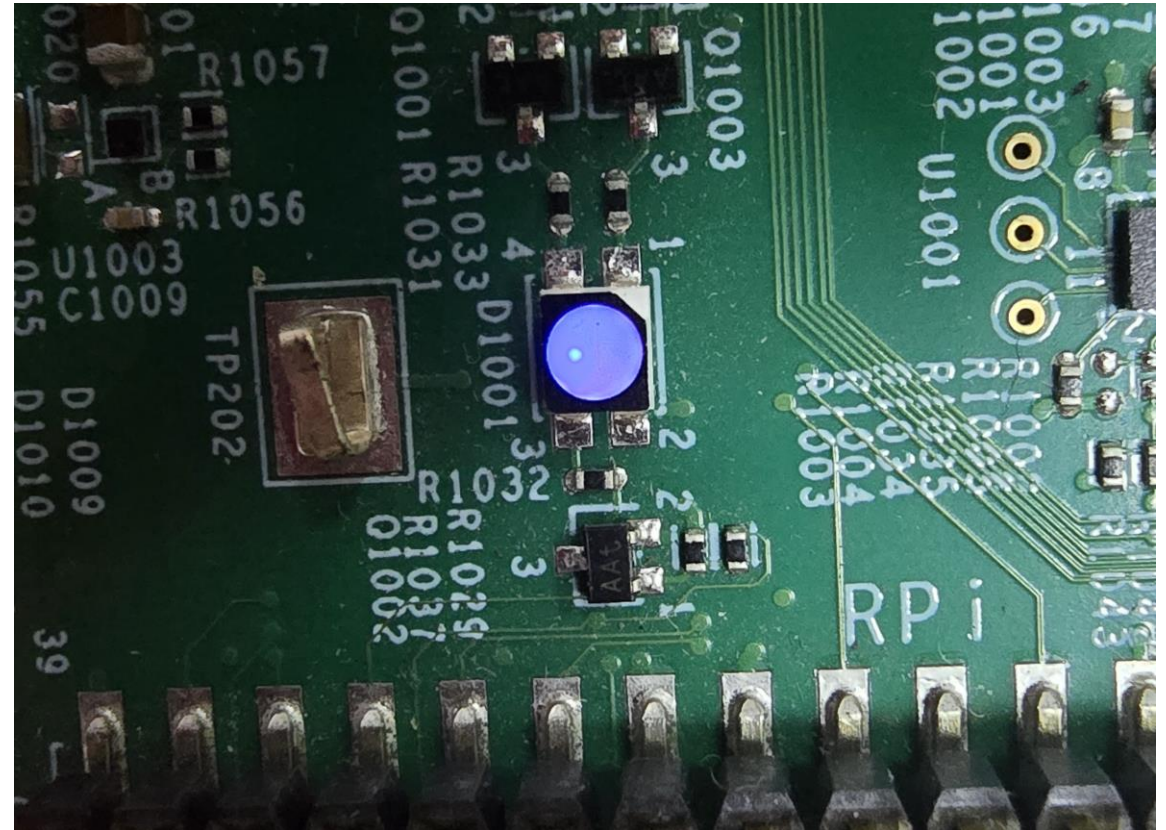
Test PWM (Cont.)

Blue(MX93_PAD_GPIO_IO12__TPM3_CH2)

```
echo 2 > /sys/class/pwm/pwmchip0/export
echo 5000000 > /sys/class/pwm/pwmchip0/pwm2/period
echo 1000000 >
/sys/class/pwm/pwmchip0/pwm2/duty_cycle
echo 1 > /sys/class/pwm/pwmchip0/pwm2/enable

echo 0 > /sys/class/pwm/pwmchip0/pwm2/enable

echo 1000 > /sys/class/pwm/pwmchip0/pwm2/duty_cycle
```



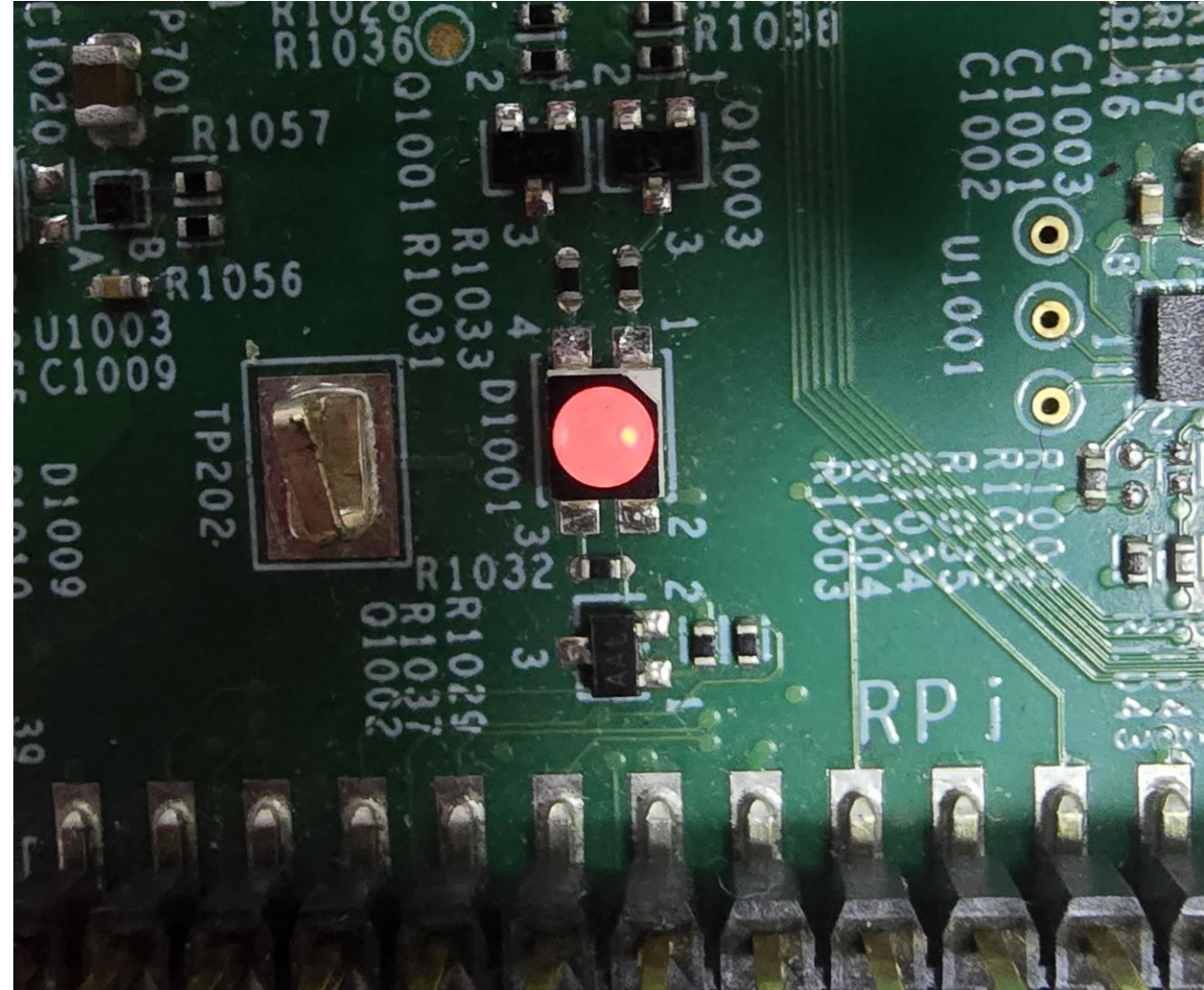
Test PWM (Cont.)

Red(MX93_PAD_GPIO_IO13__TPM4_CH2)

```
echo 2 > /sys/class/pwm/pwmchip4/export
echo 5000000 > /sys/class/pwm/pwmchip4/pwm2/period
echo 1000000 >
/sys/class/pwm/pwmchip4/pwm2/duty_cycle
echo 1 > /sys/class/pwm/pwmchip4/pwm2/enable

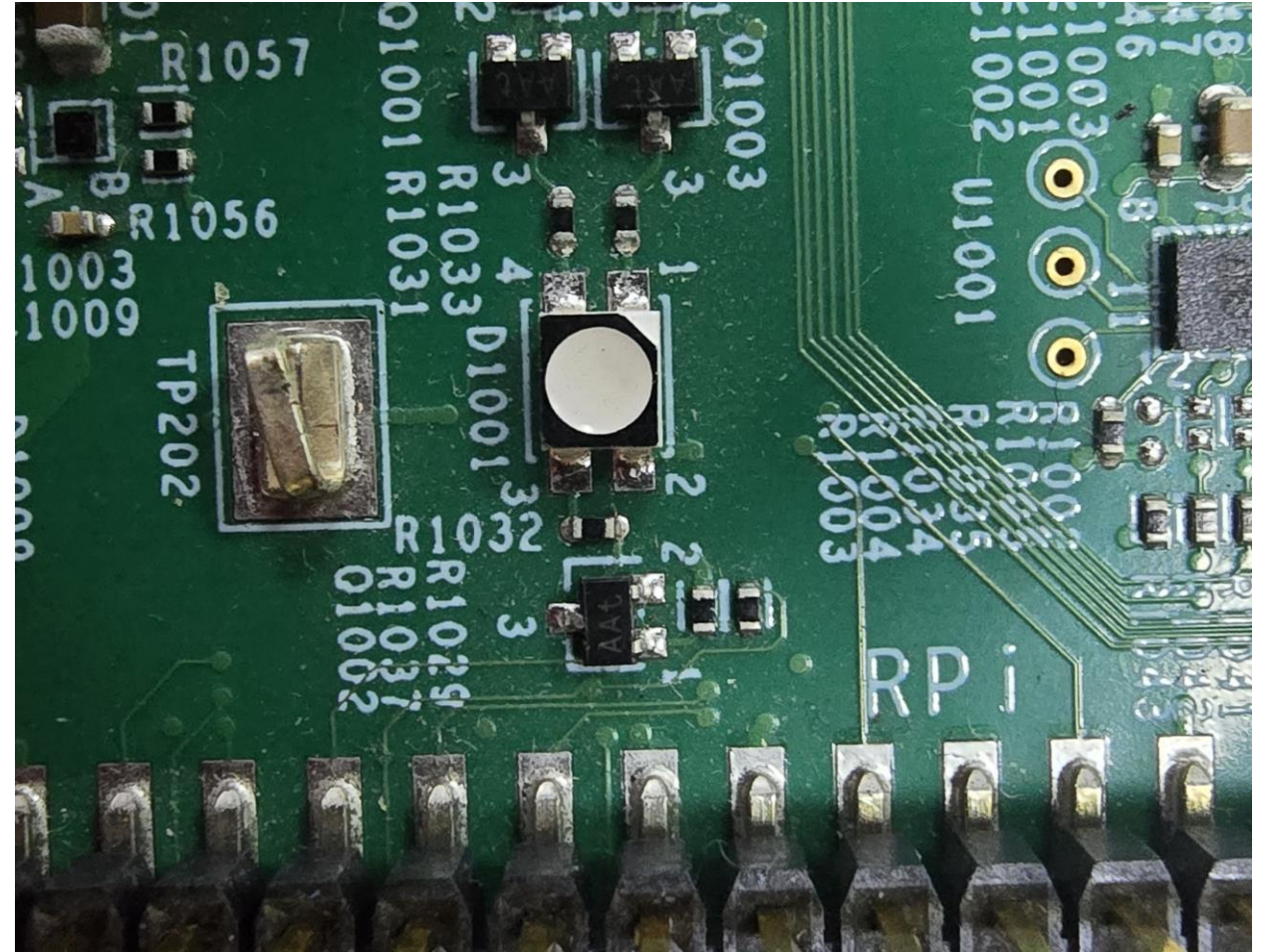
echo 0 > /sys/class/pwm/pwmchip4/pwm2/enable

echo 1000 > /sys/class/pwm/pwmchip4/pwm2/duty_cycle
```



Test PWM (Cont.)

When you enable Green, Blue and Red with the same duty cycle, you will get White.



Test PWM Led

Using mx93-11x11-evk-pwm-led.dtb compiled from mx93-11x11-evk-pwm-led.dts

```
echo 128 > /sys/class/leds/Green::TPM3_CH0/brightness  
echo 0 > /sys/class/leds/Green::TPM3_CH0/brightness  
echo 128 > /sys/class/leds/Blue::TPM3_CH2/brightness  
echo 0 > /sys/class/leds/Blue::TPM3_CH2/brightness  
echo 128 > /sys/class/leds/Red::TPM4_CH2/brightness  
echo 0 > /sys/class/leds/Red::TPM4_CH2/brightness
```



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