

How to add iMX8QXP PAD (GPIO) Wakeup

1/15/2020

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iMX8QXP GPIO Wakeup difference

wakeup-source in gpio-keys works for iMX6

But it doesn't work in iMX8QXP

```
149     gpio-keys {
150         compatible = "gpio-keys";
151         pinctrl-names = "default";
152         pinctrl-0 = <&pinctrl_gpio_keys>;
153
154         power {
155             label = "Power Button";
156             gpios = <&gpio2 3 GPIO_ACTIVE_LOW>;
157             linux,code = <KEY_POWER>;
158             wakeup-source; Doesn't work for i.MX8QXP
159         };
```

linux/Documentation/devicetree/bindings/input/gpio-keys.txt

iMX8QXP GPIO Wakeup difference(Cont.)

iMX8QXP wakeup using imx driver

CONFIG_GPIO_MXC_PAD_WAKEUP

linux/drivers/gpio/gpio-mxc.c

So far, no binding guide, but can read the code to know about how to modify the dts

pad-wakeup gpio-mxc.c

iMX8QXP using **pad-wakeup**. So far, no binding guide, but can understand it from source code.

```
595 #ifdef CONFIG_GPIO_MXC_PAD_WAKEUP
596     /*
597     * parse pad wakeup info from dtb, each pad has to provide
598     * <pin_id, type, line> these info should be put in each
599     * gpio node and with a "pad-wakeup-num" to indicate the
600     * total lines are with pad wakeup enabled.
601     */
602     if (!of_property_read_u32(np, "pad-wakeup-num", &port->pad_wakeup_num)) {
603         if (port->pad_wakeup_num != 0) {
604             if (!gpio_ipc_handle) {
605                 sciErr = sc_ipc_getMuID(&mu_id);
606                 if (sciErr != SC_ERR_NONE) {
607                     dev_err(&pdev->dev,
608                             "can not obtain mu id: %d\n", sciErr);
609                     return sciErr;
610                 }
611                 sciErr = sc_ipc_open(&gpio_ipc_handle, mu_id);
612                 if (sciErr != SC_ERR_NONE) {
613                     dev_err(&pdev->dev,
614                             "can not open mu channel to scu: %d\n", sciErr);
615                     return sciErr;
616                 }
617             }
618             for (i = 0; i < port->pad_wakeup_num; i++) {
619                 of_property_read_u32_index(np, "pad-wakeup",
620                     i * 3 + 0, &port->pad_wakeup[i].pin_id);
621                 of_property_read_u32_index(np, "pad-wakeup",
622                     i * 3 + 1, &port->pad_wakeup[i].type);
623                 of_property_read_u32_index(np, "pad-wakeup",
624                     i * 3 + 2, &port->pad_wakeup[i].line);
625             }
626         }
627     }
628 #endif
```

pad-wakeup gpio-mxc.c(Cont.)

pin id:

linux/include/dt-bindings/pinctrl/pads-imx8qxp.h

Example **27** for SC_P_USDHC1_CD_B

```
#define SC_P_USDHC1_CD_B 27 /*  
CONN.USDHC1.CD_B, CONN.NAND.DQS_P, ADMA.SPI2.CS0,  
CONN.NAND.DQS, LSIO.GPIO4.IO22 */
```

type:

linux/include/soc/imx8/sc/svc/pad/api.h

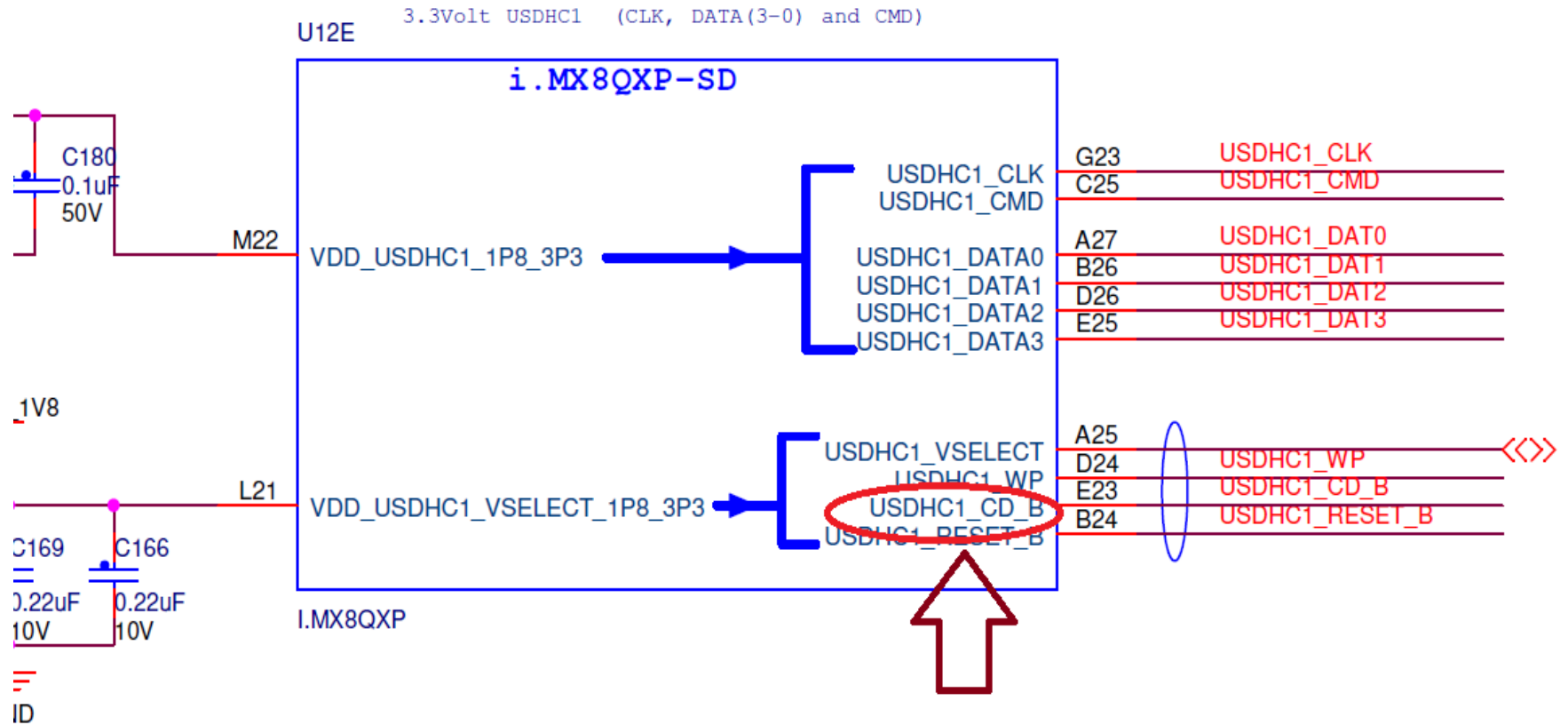
```
140 #define SC_PAD_WAKEUP_OFF 0U /* Off */  
141 #define SC_PAD_WAKEUP_CLEAR 1U /* Clears pending flag */  
142 #define SC_PAD_WAKEUP_LOW_LVL 4U /* Low level */  
143 #define SC_PAD_WAKEUP_FALL_EDGE 5U /* Falling edge */  
144 #define SC_PAD_WAKEUP_RISE_EDGE 6U /* Rising edge */  
145 #define SC_PAD_WAKEUP_HIGH_LVL 7U /* High-level */
```

line:

Bit in 32bit gpio group

OF_CHANGE	
21-19	wakeup control
WAKEUP_CTR	wakeup control
L	000b - OFF 001b - RESAMPLE (The wak done, the flag is cleared) 100b - LOW 101b - FALL 110b - RISE 111b - HIGH
40 7	reserved

Test on iMX8QXP MEK



Using gpio4 bit 22, pad/pin USDHC1_CD_B to do test

Test on iMX8QXP MEK(Cont.)

fsl-imx8qxp-mek.dts modification

```
13 */
14
15 /dts-v1/;
16
17 #include "fsl-imx8qxp-mek.dtsi"
18
19
20 &gpio4 {
21
22     pad-wakeup-num = <1>;
23     pad-wakeup = <SC_P_USDHC1_CD_B 5 22>;
24
25 };
26
```

pin_id = SC_P_USDHC1_CD_B(27)

type = 5(Falling edge)

line = 22(bit 22)

Test on iMX8QXP MEK(Cont.)

echo mem > /sys/power/state

Then plugin the sdcard into iMX8QXP MEK sdcard slot and wakeup.

```
imx8qxpmeek login: root
Last login: Wed Feb 20 20:24:23 UTC 2019 on tty7
[ 15.858888] audit: type=1006 audit(1550694271.348:3): pid=3792 uid=0 old-auid=4294967295
root@imx8qxpmeek:~# echo mem > /sys/power/state
[ 24.096253] PM: suspend entry (deep)
[ 24.099839] PM: Syncing filesystems ... done.
[ 24.118609] Freezing user space processes ... (elapsed 0.001 seconds) done.
[ 24.907333] GICv3: CPU1: found redistributor 1 region 0:0x00000000b1b20000
```



plugin the sdcard into iMX8QXP MEK sdcard slot and wakeup



```
[ 24.910072] gpio-mxc 5d0c0000.gpio: wakeup by pad, line 22
[ 24.921877] gpio-mxc 5d0c0000.gpio: wakeup by pad, line 22
[ 25.753078] PM: resume devices took 0.612 seconds
[ 25.879666] OOM killer enabled.
[ 25.882821] Restarting tasks ... done.
```