# Changing DOUT pins in mbSID v2

### **Overview**

If you're like me, you'd rather change the software mapping of the output (LED) pins than wire everything according to the original schematic - which may not even be possible due to differences in the CS. This HowTo will demonstrate one of the many ways to change the mapping according to your own wiring. This HowTo is only meant to change LEDs which are connected to individual pins. With LEDs connected as a matrix this will not work.

### Difficulty level:

• easy <sub>0-1-2-3-</sub>**4**<sub>-5-6-7-8-9</sub> hard

### Required actions:

- Search/manually edit
- · Install other software
- Compile

### Affected files [1]:

setup\_\*.asm

#### Required software:

http://www.ucapps.de/mios/dout\_buttons\_v1\_3a.zip

## **Step-by-Step description**

## 1. Finding the correct pins

- Download the dout\_buttons\_v1\_3a application. This application lights one LED at a time and displays its SR and pin number.
- Install it on the (master) core
- Power up the core. Your dispay should now show sth. like this

Digital Out Test

#### SR# 1 Pin#0 0x00

• Upon pressing a button which is connected to an odd pin the program will increase number of the pin to power. Pressing the button once will display this:

```
Digital Out Test
SR# 1 Pin#1 0x01
```

- Pressing a button which is connected to an even pin will decrease the number of the pin to power.
- Toggle through the pins and SRs and write down the SR# and Pin# for every LED until all of your leds have been lit.
- At this point you know have all the SR# and Pin# for all the LEDs

### 2. Changin the source code

- Open setup\_\*.asm
- Find the table called CS\_MENU\_DOUT\_TABLE which looks like this:

```
CS MENU DOUT TABLE
             Register and bit
                                        SR#
                                               Pin#
                                                         Description
   DOUT ENTRY
                 CS MENU SELECTED SID FLAGS, 0,
                                                      1, 0;
SID1 LED (Note: Pin #0 is the D7 output of first SR)
   DOUT ENTRY
                 CS MENU SELECTED SID FLAGS, 1,
SID2 LED
   DOUT ENTRY
                 CS MENU SELECTED SID FLAGS, 2,
SID3 LED
   DOUT ENTRY
                 CS MENU SELECTED SID FLAGS, 3,
                                                            3
SID4 LED
                                           1,
   DOUT ENTRY
                 CS MENU MODE, 0,
                                                  4 ; Shift LED
   DOUT ENTRY
                 CS MENU MODE, 1,
                                           1,
                                                 5
                                                      ; CC LED
   DOUT ENTRY
                 CS MENU MODE, 4,
                                            1,
                                                       ; Edit LED
   DOUT_ENTRY
                 CS MENU SELECTED OSC FLAGS, 0,
                                                      2,
OSC1 LED
   DOUT ENTRY
                 CS MENU SELECTED OSC FLAGS, 1,
                                                      2.
OSC2 LED
   DOUT ENTRY
                 CS MENU SELECTED OSC FLAGS, 2,
                                                      2,
                                                            2
OSC3 LED
   DOUT ENTRY
                 TMP1, 0,
                                        2,
                                                  ; OSC Env LED
                                        2,
   DOUT ENTRY
                 TMP1, 1,
                                                   ; OSC Misc LED
   DOUT ENTRY
                 TMP1, 2,
                                                   ; OSC Assign LED
                 TMP1, 4,
   DOUT ENTRY
                                        3,
                                                  ; OSC Triangle LED
   DOUT ENTRY
                 TMP1, 5,
                                        3,
                                                   ; OSC Saw LED
```

```
DOUT ENTRY
              TMP1, 6,
                                        3,
                                              2
                                                    ; OSC Pulse LED
DOUT ENTRY
              TMP1, 7,
                                        3,
                                              3
                                                    ; OSC Noise LED
DOUT ENTRY
              TMP2, 0,
                                        2,
                                                    ; OSC Sync LED
              TMP2, 1,
DOUT ENTRY
                                        2,
                                              7
                                                    ; OSC Ring LED
              TMP3, 0,
                                        3,
DOUT ENTRY
                                                    : Filter 01 LED
DOUT ENTRY
              TMP3, 1,
                                        3,
                                              5
                                                    ; Filter 02 LED
DOUT ENTRY
              TMP3, 2,
                                        3,
                                                    ; Filter 03 LED
                                              6
DOUT ENTRY
              TMP3, 3,
                                        3,
                                              7
                                                    ; Filter Ext LED
DOUT ENTRY
              TMP3, 4,
                                        4,
                                                    ; Filter LP LED
DOUT ENTRY
              TMP3, 5,
                                        4,
                                              1
                                                    ; Filter BP LED
              TMP3, 6,
                                        4,
                                              2
                                                    ; Filter HP LED
DOUT ENTRY
DOUT ENTRY
              TMP3, 7,
                                              3
                                        4,
                                                    ; Filter 30 LED
DOUT ENTRY
              TMP2, 4,
                                        4,
                                                    ; ENV1 LED
DOUT ENTRY
              TMP2, 5,
                                        4,
                                                    ; ENV2 LED
                                              5
DOUT_ENTRY
              TMP2, 6,
                                        4,
                                              6
                                                    ; ENV Ctrl LED
              TMP2, 7,
                                        4,
DOUT ENTRY
                                              7
                                                    ; ENV Assign LED
                                        5,
DOUT ENTRY
              TMP4, 0,
                                                    ; LF01 LED
              TMP4, 1,
DOUT ENTRY
                                        5,
                                              1
                                                    ; LF02 LED
DOUT ENTRY
              TMP4, 2,
                                        5,
                                              2
                                                    ; LF03 LED
              TMP4, 3,
                                        5,
                                              3
DOUT ENTRY
                                                    ; LF04 LED
DOUT ENTRY
              TMP4, 4,
                                        5,
                                              4
                                                    ; LF05 LED
DOUT ENTRY
              TMP4, 5,
                                        5,
                                              5
                                                    ; LF06 LED
DOUT ENTRY
              TMP5, 0,
                                        5,
                                                    ; LFO Sine LED
              TMP5, 1,
                                        5,
                                              7
DOUT ENTRY
                                                    ; LFO Triangle LED
              TMP5, 2,
DOUT ENTRY
                                        6,
                                              0
                                                    ; LFO Saw LED
              TMP5, 3,
                                        6,
                                              1
                                                    ; LFO Pulse LED
DOUT ENTRY
              TMP5, 4,
                                              2
                                                    ; LFO Random LED
DOUT ENTRY
                                        6,
;; additional LED functions which could be added:
;; o Play LED (TMP5, 6)
;; o Mode Meter LED (TMP2, 2)
;; o Mode Matrix LED (TMP2, 3)
;; o SID L LED (TMP4, 6)
;; o SID R LED (TMP4, 7)
;; o LFO Positive LED (TMP5, 5)
;; don't remove this "end-of-table" entry!
DOUT ENTRY EOT
```

- All you need to change is the 4th and 5th column (SR# and Pin#)
- I usually set all SR# and Pin# to 0 before changing anything that way it's hard to miss anything and it keeps you from having doubles if you do not use of the buttons
- Go through the list you've made earlier and change the Pin# and SR# according to it for each

LED.

• If there are LEDs you don't have on your CS just comment out that line by adding ;; (two semi-colons) to the beginning of that line. Like this:

```
;; this LED will work

DOUT_ENTRY CS_MENU_MODE, 0, 1, 4 ; Shift LED

;; this LED has been removed by commenting out
;; DOUT_ENTRY CS_MENU_MODE, 0, 1, 4 ; Shift LED
```

• Done with the LEDs

## 3. (Optional) Additional predefined LEDs

- If you want to use any of the predefined LEDs that are commented out by default this is how to do it.
- At the end of the CS MENU DOUT TABLE you'll find this

```
;; additional LED functions which could be added:
    ;; o Play LED (TMP5, 6)
    ;; o Mode Meter LED (TMP2, 2)
    ;; o Mode Matrix LED (TMP2, 3)
    ;; o SID L LED (TMP4, 6)
    ;; o SID R LED (TMP4, 7)
    ;; o LFO Positive LED (TMP5, 5)
```

Those LEDs are predefined but not used. To use them just add a line to the table. Let's say we
want the "Play LED"

```
;; o Play LED (TMP5, 6)
```

 Remove the ;; and the parentheseses and replace the name ("Play LED") by DOUT\_ENTRY giving you this:

```
;; DOUT_ENTRY TMP5, 6
```

• Now add "," + SR# + "," + Pin# giving you sth like this:

```
;; DOUT_ENTRY TMP5, 6, 4, 7
```

• This would already work but it's a good idea to add a comment to it so you remember what this LED does:

```
;; DOUT_ENTRY TMP5, 6, 4, 7 ;; Play LED - whee!
```

Done with the extra LEDs

## 4. Recompile

- Now recompile the setup\_\*.asm
- Send it to your mbSID via MIOSStudio
- You're all done!

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