

# 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 0-1-2-3 **4** 5-6-7-8-9 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](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 display 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,      1,    1    ;
SID2 LED
DOUT_ENTRY  CS_MENU_SELECTED_SID_FLAGS, 2,      1,    2    ;
SID3 LED
DOUT_ENTRY  CS_MENU_SELECTED_SID_FLAGS, 3,      1,    3    ;
SID4 LED

DOUT_ENTRY  CS_MENU_MODE, 0,                1,    4    ; Shift LED
DOUT_ENTRY  CS_MENU_MODE, 1,                1,    5    ; CC LED
DOUT_ENTRY  CS_MENU_MODE, 4,                1,    6    ; Edit LED

DOUT_ENTRY  CS_MENU_SELECTED_OSC_FLAGS, 0,      2,    0    ;
OSC1 LED
DOUT_ENTRY  CS_MENU_SELECTED_OSC_FLAGS, 1,      2,    1    ;
OSC2 LED
DOUT_ENTRY  CS_MENU_SELECTED_OSC_FLAGS, 2,      2,    2    ;
OSC3 LED

DOUT_ENTRY  TMP1, 0,                        2,    3    ; OSC Env LED
DOUT_ENTRY  TMP1, 1,                        2,    4    ; OSC Misc LED
DOUT_ENTRY  TMP1, 2,                        2,    5    ; OSC Assign LED

DOUT_ENTRY  TMP1, 4,                        3,    0    ; OSC Triangle LED
DOUT_ENTRY  TMP1, 5,                        3,    1    ; 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,  6  ; OSC Sync LED
DOUT_ENTRY    TMP2, 1,      2,  7  ; OSC Ring LED

DOUT_ENTRY    TMP3, 0,      3,  4  ; Filter 01 LED
DOUT_ENTRY    TMP3, 1,      3,  5  ; Filter 02 LED
DOUT_ENTRY    TMP3, 2,      3,  6  ; Filter 03 LED
DOUT_ENTRY    TMP3, 3,      3,  7  ; Filter Ext LED

DOUT_ENTRY    TMP3, 4,      4,  0  ; Filter LP LED
DOUT_ENTRY    TMP3, 5,      4,  1  ; Filter BP LED
DOUT_ENTRY    TMP3, 6,      4,  2  ; Filter HP LED
DOUT_ENTRY    TMP3, 7,      4,  3  ; Filter 30 LED

DOUT_ENTRY    TMP2, 4,      4,  4  ; ENV1 LED
DOUT_ENTRY    TMP2, 5,      4,  5  ; ENV2 LED

DOUT_ENTRY    TMP2, 6,      4,  6  ; ENV Ctrl LED
DOUT_ENTRY    TMP2, 7,      4,  7  ; ENV Assign LED

DOUT_ENTRY    TMP4, 0,      5,  0  ; LF01 LED
DOUT_ENTRY    TMP4, 1,      5,  1  ; LF02 LED
DOUT_ENTRY    TMP4, 2,      5,  2  ; LF03 LED
DOUT_ENTRY    TMP4, 3,      5,  3  ; LF04 LED
DOUT_ENTRY    TMP4, 4,      5,  4  ; LF05 LED
DOUT_ENTRY    TMP4, 5,      5,  5  ; LF06 LED

DOUT_ENTRY    TMP5, 0,      5,  6  ; LF0 Sine LED
DOUT_ENTRY    TMP5, 1,      5,  7  ; LF0 Triangle LED
DOUT_ENTRY    TMP5, 2,      6,  0  ; LF0 Saw LED
DOUT_ENTRY    TMP5, 3,      6,  1  ; LF0 Pulse LED
DOUT_ENTRY    TMP5, 4,      6,  2  ; LF0 Random LED

;; 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 LF0 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 parentheses 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 MIOSSstudio
- You're all done!

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