



## MESHLE MULTI LED Interface

### Overview

MDBT-MUTLY – Bluetooth Module based on Nordic nRF52840 SoC Solution (Revision 2 IC) with pre-flashed MESHLE MULTIY (Dimmer/CCT/RGB/RGBW/RGBTW) Interface Firmware. Suitable ideally for Light Control applications based on PWM/SPI signal. For the detailed module datasheet see [MDBT50Q-1MV2](#)

#### 1 MESHLE MULTI LED Interface

##### 1.1 Overview

##### 1.2 Pinout

##### 1.2.1 Reference Circuit

##### 1.3 Interface Parametrization

##### 1.3.1 By Manufacturer

##### 1.3.1.1 Hardware Parametrization

##### 1.3.1.2 Software Parametrization:

##### 1.3.3 By User

##### 1.3.3.1 Via Button

### Hardware Features

- BT5.4 qualified module designed based on Nordic nRF52840 SoC solution
- Compact size with 10.5 x 15.5 x 2.05 mm
- Complete BT5.4 / BT5.3 / BT5.2 / BT5.1 / BT5 low energy solution with integrated chip antenna
- Pre-Certified Module: FCC / IC / CE / Telec / KC / SRRC / NCC / WPC Certified & CE RED / RCM Compliant.
- 32-bit ARM® Cortex™ M4F CPU
- Supply: 1.7V – 5.5V
- Operating Temp: -40°C to +85°C

### Software Features

- |   |  |  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• Password-protected Bluetooth mesh network</li> <li>• Configuration and control via smartphone</li> <li>• Adjustable PWM Signal</li> <li>• Alternatively with SPI Output Signal</li> <li>• Group control</li> </ul> | <ul style="list-style-type: none"> <li>• Timers</li> <li>• Rules</li> <li>• Adjustable start up state</li> <li>• Firmware Update Over The Air (OTA)</li> </ul> | <ul style="list-style-type: none"> <li>• Support Bluetooth EnOcean-Sensors &amp; Kinetic Wall Switches</li> <li>• Remote Control*</li> <li>• Voice Control*</li> <li>• Cloud Dashboard*</li> </ul> <p>*Gateway is required</p> |
|---|--|--|

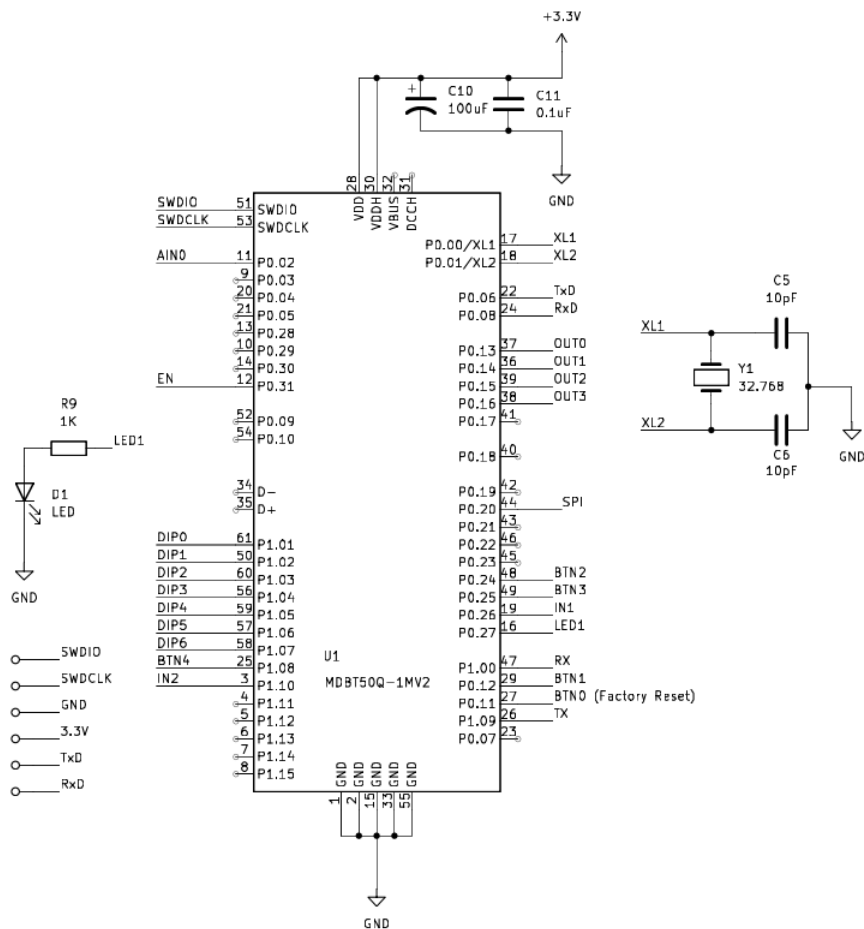
## Pinout

Pin-Label	Pin-Function	Pin-Name	Pin-Number	Input / Output	Dimmer	CCT	CCT+	RGB	RGBW	RGBTW	SPI
OUT0	PWM Channel 1	P0.13	37	OUT PWM	White	Warm White	Brightness	Red	Red	Red	
OUT1	PWM Channel 2	P0.14	36	OUT PWM	White	Cold White	White Balance	Green	Green	Green	
OUT2	PWM Channel 3	P0.15	39	OUT PWM	White	Warm White		Blue	Blue	Blue	
OUT3	PWM Channel 4	P0.16	38	OUT PWM	White	Cold White			White	Warm White	
OUT4	PWM Channel 5	P0.17	41	OUT PWM						Cold White	
SPI		P0.20	44	OUT SPI							Data
IN1	PIR 1 / PUSH BUTTON / SWITCH	P0.26	19	IN (Pulled Down)	Optional external input interface, this can be PIR Sensor, Switch or Push-Button						
IN2	PIR 2 / PUSH BUTTON / SWITCH	P1.10	03	IN (Pulled Down)							
TxD	Terminal	P0.06	22	OUT	UART Terminal Interface that can be used to - Run Tests (Quality control at the production line) - Change Driver Interface (Only when supported by the firmware) - Set Parameters (Parametrisation at the production line)  UART Terminal works only if "Enable Terminal" pin is connected to GND See "Terminal" Section for more info						
RxD	Terminal	P0.08	24	IN							
Enable Terminal	Enable Terminal	P0.31	12	IN (Pulled Up)							
LED1	Info LED	P0.27	16	OUT	Info LED shows the state of the device (configuration in network) or mode when changing the device interface via Button. See "Info LED" section						
BTNO Factory Reset	Factory Reset-/ Program-Button	P0.11	27	IN (Pulled Up)	Software Reset Button is used to reboot, reset device to factory settings, change device interface (only when supported by firmware). See "Reset" section						
BTN1	Button 1	P0.12	29	IN (Pulled Up)	Optional buttons available on the device. The functionality is described in "Buttons" section.						
BTN2	Button 2	P0.24	48	IN (Pulled Up)							
BTN3	Button 3	P0.25	49	IN (Pulled Up)							
BTN4	Button 4	P1.08	25	IN (Pulled Up)							
DIP0		P1.01	61	IN (Pulled Up)	Optional DIP switches are used to change device interface. See "DIP Switches" section for more info.						
DIP1		P1.02	50	IN (Pulled Up)							
DIP2		P1.03	60	IN (Pulled Up)							
DIP3		P1.04	56	IN (Pulled Up)							
DIP4		P1.05	59	N (Pulled Up)	Optional DIP switches are used to change the PWM frequency						
DIP5		P1.06	57	N (Pulled Up)							

Pin-Label	Pin-Function	Pin-Name	Pin-Number	Input / Output	Dimmer	CCT	CCT+	RGB	RGBW	RGBTW	SPI
DIP6					Invert Dimm PWM						
RX	UART	P1.00	47	IN	UART Interface for devices that work with secondary MCU. See "UART Interface" section for more info						
TX	UART	P1.09	26	OUT							
AIN0	Overheat Protection	P0.02	11	IN (Pulled Up)	Optional Analog Input. See "Analog Input" section for more info						
XL1*	External Oscillator	P0.00	17		All MESHLE Modules must have external oscillator connected. See "External Oscillator" or Reference Schematics for more info						
XL2*	External Oscillator	P0.01	18								
SWDIO	Debug-/Flash-Interface	SWDIO	51		Optional, but preferable test pins/connector for flash interface.						
SWDCLK	Debug-/Flash-Interface	SWDCLK	53								
VDD*	+3V3	VDD	28		Power supply						
VDDH*	+3V3	VDDH	30								
GND*	Ground	GND_1, GND_2, GND_3, GND_4, GND_5	1, 2, 15, 33, 55, GND								

\*-marked pins must be connected in order for the module to work

## Reference Circuit



## Interface Parametrization

There are multiple ways to pre-configure BLE Module to behave as specific device interface like dimmer, cct, rgb, rgbw or to work in a specific mode or pwm frequency.

### By Manufacturer

There are two ways two ways to predefine specific device settings at the manufacturing process, via hardware or software pre-configuration.

#### Hardware Parametrization

**Interface Type:** The default interface can be determined by setting the DIP0-3 to GND. This can be done by PCB Routing, 0-Ohm resistors or a DIP-Switch.

**CCT\_PLUS:** Describes the mode specifically for CCT interface in which the dimming (brightness regulation) is done via PWM on OUT0 and White Balance is done via PWM signal on OUT1, where Warm White is 0%, Neutral White is 50% and Cold White is 100%. The warm and cold white can be swapped at the configuration process in the App.

**Invert Dim PWM:** For dimming channels only, if disabled (default) HI means 100% PWM and LO means 0%. Enabling Invert Dim will invert only for dimming out channels.

**PWM Frequency:** define the PWM frequency.

Please refer to the following coding table for selecting the right configuration.

**Note:** In case of DIP-Switch, in order to take effect, after changing switch position, device must be rebooted (disconnect and reconnect power supply).

Interface Type				CCT_PLUS		Invert Dim PWM		PWM Frequency		
DIP 0	DIP 1	DIP 2	Option	DIP 3	Option	DIP 4	Option	DIP 5	DIP 6	Option
-	-	-	DEFAULT	-	Disabled	-	Disabled	-	-	Default (4K)
✓	-	-	DIMMER	✓	Enabled	✓	Enabled	✓	-	8k
-	✓	-	CCT					-	✓	16k
-	-	✓	RGB							
-	✓	✓	RGBW							
✓	✓	✓	RGB+CCT							

✓ - connected to GND  
- - not connected

#### Software Parametrization:

Additionally to hardware commissioning, the default interface can be selected via UART interface.

**Note:** UART is only enabled if EN pin is connected to GND.

```
devt -? # list available supported device types
devt 0x01 # set interface to DIMMER interface type
```

List available interface types

DEFAULT	0x00
DIMMER	0x01
CCT	0x01
RGB	0x04
RGBW	0x05
RGB+CCT	0x06

**Note:** Hardware commissioning has a priority. If interface type was configured via DIP0-3, then changing interface is not allowed.

### By User

In some cases, the selection of device interface must be made by the enduser. In this case the selection of the interface can be done via (Soft Reset) BTNO Button, Dip Switch (if accessible) or via App.

#### Via Button

Please follow following instructions (or add these to the user manual) to change the interface type of the device:

To set the interface type by pressing the Soft Reset (BTN0), proceed as follows:  
Step 1: (only if already configured in network) Long press the reset/program key for 3 seconds, the controller restore:  
Step 2: After the controller enters the factory setting state, long press the key Soft Reset (BTN0) again for 3 seconds:  
to enter the mode of changing interface type.  
Step 3: Short press the Soft Reset (BTN0) key to switch 5 interface types sequentially:  
DIM dimming type, the indicator light blinks 1 time;  
CCT dimming type, the indicator light blinks 2 times;  
RGB dimming type, the indicator light blinks 3 times;  
RGBW dimming type, the indicator light blinks 4 times;  
RGB+CCT dimming type, the indicator light blinks 5 times.  
Step 4: Count blinking time to ensure the right mode is selected and then press for 3 seconds again, to confirm the mode.

**Note: Hardware parametrization has higher priority. If interface type was configured via DIP0-3, then changing interface via button or app is not allowed.**