



## STM8L101-EVAL demonstration firmware

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### 1 Introduction

This document describes the demonstration firmware running on the STM8L101-EVAL evaluation board. You can use it to evaluate the capabilities of the microcontroller and the on-board peripherals.

The evaluation board is delivered with the demonstration firmware stored in the Flash program memory of the microcontroller.

The firmware is based on the STM8L10x\_StdPeriph\_Lib firmware library, and provides an example of how to use this library. It is divided into various smaller demonstration applications (demos).

In case the evaluation board is not factory-programmed or the demonstration application has been erased, you can reprogram the demonstration firmware into the STM8L10x Flash memory by referring to stm8l10x-eval\_fw\_um.chm file available in the STM8L1x-EVAL\_FW package.

For more information about the evaluation board itself, please read the evaluation board user manual.

*Note: To run the demonstration firmware, JP10 jumper must be installed on the STM8L101-EVAL evaluation board.*

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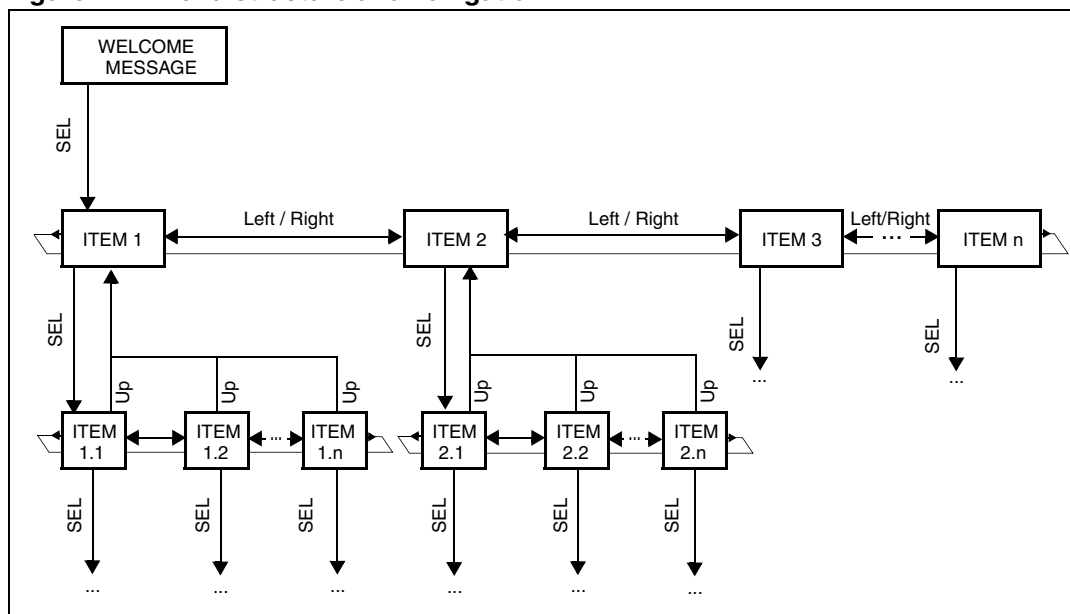
## 2 User interface

### 2.1 Menu structure

The demonstration firmware user interface is based on a circular navigation menu, with submenus, item selection and back capability.

[Figure 1](#) shows the menu system of the demonstration. The top row of items represents the main menu.

**Figure 1. Menu structure and navigation**



### 2.2 Documentation conventions

In this document, the keywords in bold indicate user actions on the joystick (5-way switch), and on the KEY button (1-way switch). They follow the conventions shown in [Table 1](#).

**Table 1. Documentation conventions**

| Keyword      | User action                 |
|--------------|-----------------------------|
| <b>LEFT</b>  | Press joystick to the left  |
| <b>RIGHT</b> | Press joystick to the right |
| <b>UP</b>    | Press joystick up           |
| <b>DOWN</b>  | Press joystick down         |
| <b>SEL</b>   | Press joystick center       |
| <b>KEY</b>   | Press KEY button            |

## 2.3 Navigating menus and sub-menus

To navigate the menus and sub-menus, perform the following actions as required:

**RIGHT:** Navigates to the next menu or sub-menu items on the right.

**LEFT:** Navigates to the next menu or sub-menu items on the left.

**SEL:** Enters sub-menu.

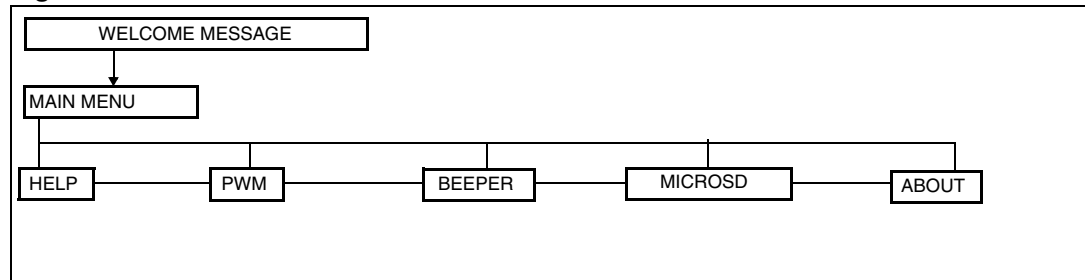
**UP:** Exits from a sub-menu.

## 3 Demonstration applications

### 3.1 Menu overview

The [Figure 2](#) shows all the menu and submenus of the demonstration applications.

**Figure 2. Menu overview**

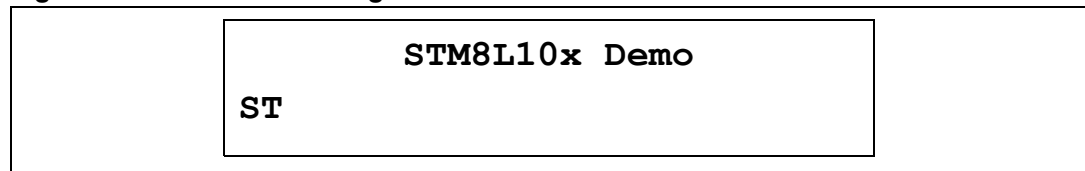


The following sections provide a detailed description of each part of the demonstration firmware.

### 3.2 Welcome screen and main menu

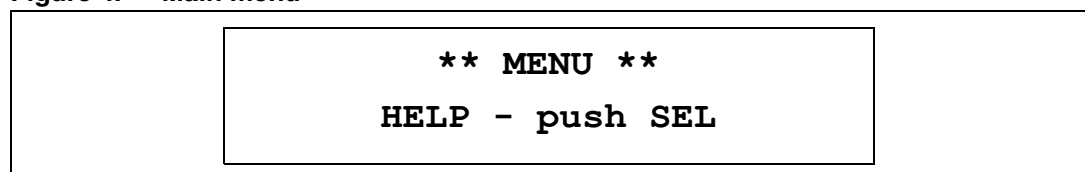
After a board RESET, a welcome message is displayed on the first line, the ST logo is displayed moving on the second line and a melody is played (see [Figure 3](#)). The introduction melody can be changed by using the PWM demo (see [Section 3.4](#)).

**Figure 3. Welcome message**



Once the melody is played, the main menu is activated and the message shown in [Figure 4](#) is displayed:

**Figure 4. Main menu**

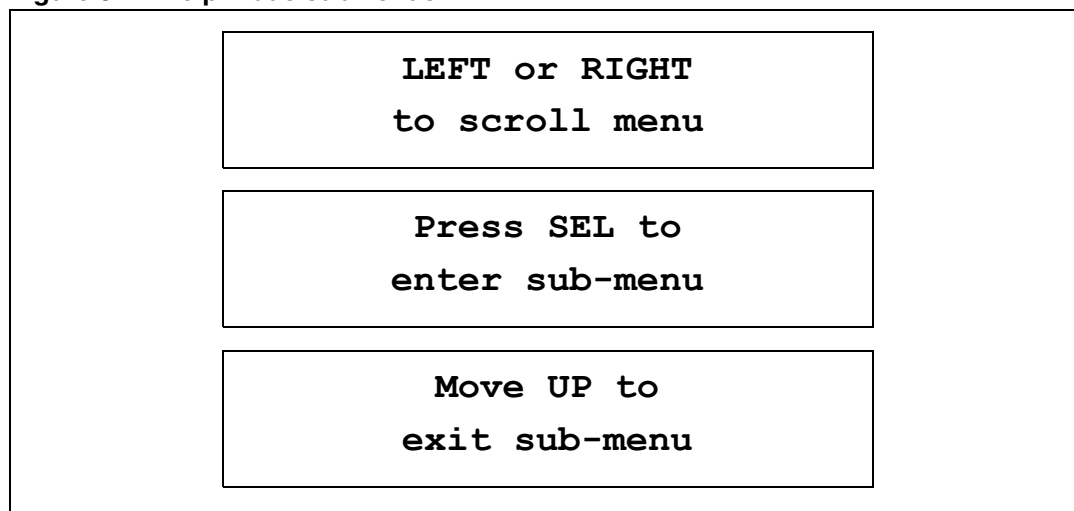


*Note:* Pressing the joystick in any direction (for around 1 second) ends the melody.

### 3.3 Help mode

Pressing **SEL** from the main menu enters the *Help* mode. The following messages are displayed sequentially on the LCD screen with a few second delay:

Figure 5. Help mode submenus



To exit this demo, press the joystick **UP**.

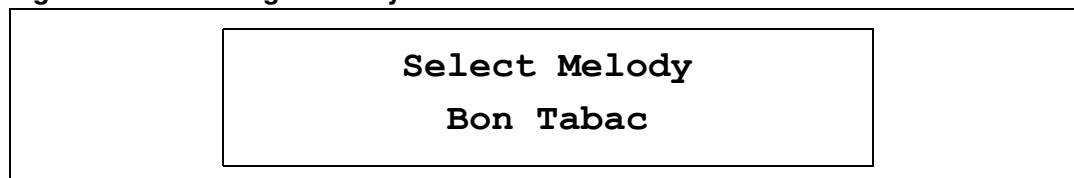
### 3.4 PWM demo

This mode demonstrates the Timer peripheral operating in PWM mode. Make sure that the JP9 jumper is installed in the PSW position.

This demo is used to select and play one melody among a selection stored in the Flash memory (see [Figure 6](#)):

1. Navigate between the melodies by pressing the joystick **LEFT** or **RIGHT**, and press **SEL** to select and play the melody (see [Figure 6](#))

Figure 6. Selecting a melody



2. The first time **UP** is pressed, the melody is stopped.

*Note:* Keep the joystick pressed **UP** for a short time to allow the action to be taken into account.

3. If you press **UP**, you exit from the demo.

**LEFT/RIGHT:** Press the joystick **LEFT** or **RIGHT** to navigate the melodies.

**SEL:** Press **SEL** to select a melody and play it.

### 3.5 BEEPER demo

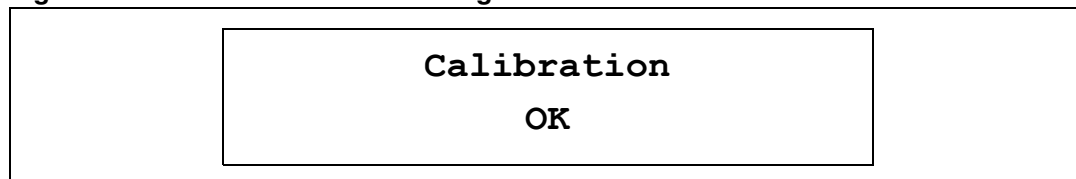
This mode demonstrates the 3 different frequencies that can be output on the BEEP pin. Prior to running the BEEPER demo,

- Install the JP9 jumper in the Beep position.
- Exit the Debug session since the BEEPER demo can be run only in standalone mode.

When this mode is entered, the LSI clock is calibrated by TIM2.

The message shown in [Figure 7](#) is displayed at the end of calibration:

**Figure 7. End of calibration message**



After a short time, another message shows the current output frequency.

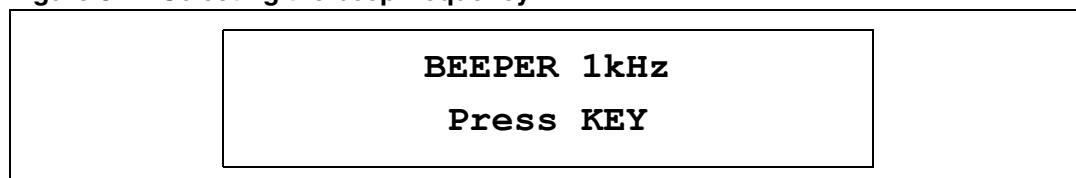
Press the **KEY** button repeatedly to change the frequency in this order:

- 1 kHz
- 2 kHz
- 4 kHz
- 1-2-4 kHz
- OFF
- 1 kHz etc...

The frequency selected is displayed on the LCD screen (see [Figure 8](#))

The LEDs also change depending on the selected frequency.

**Figure 8. Selecting the beep frequency**



**UP:** Press the joystick **UP** to exit the demo.

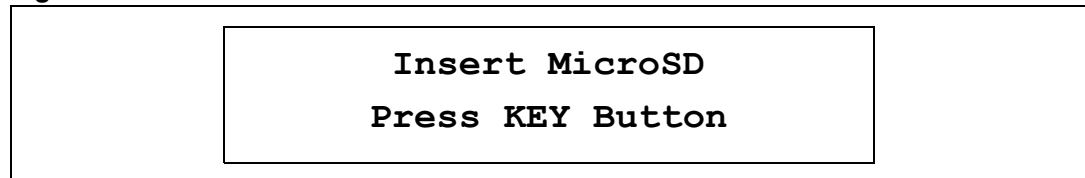
**KEY:** Press the **KEY** button to change the beeper frequency.

### 3.6 MICROSD demo

This mode demonstrates the basic operation of the MicroSD card interface.

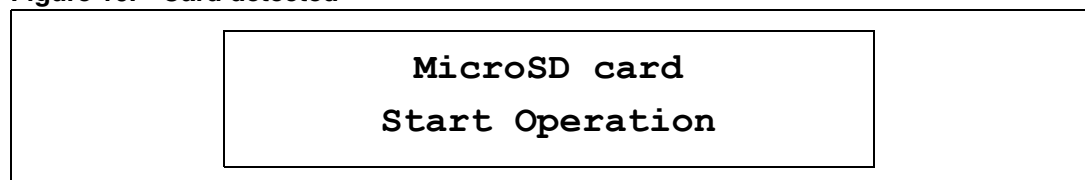
1. When this mode is entered, a MicroSD card must be inserted in the slot.
  - The message shown in [Figure 9](#) is displayed on the LCD screen:

**Figure 9. No card found**



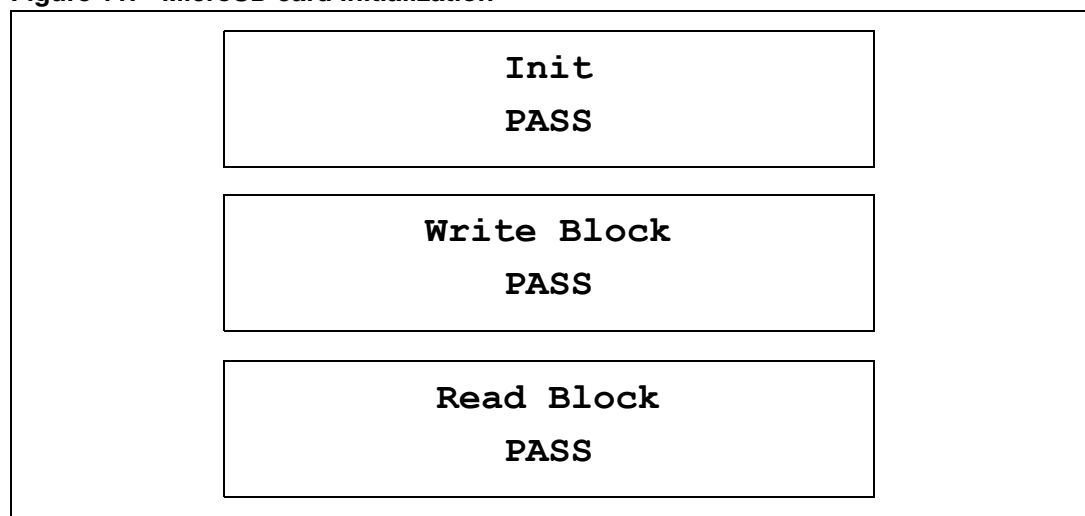
- When a MicroSD card is detected, another message is displayed (see [Figure 10](#)):

**Figure 10. Card detected**



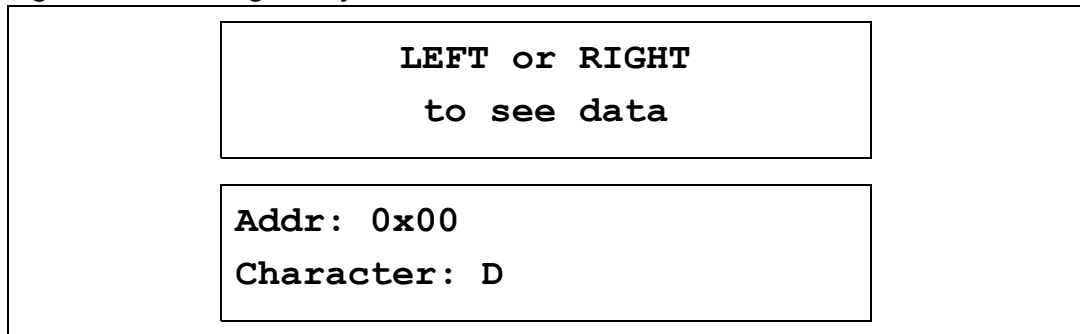
2. Then the MicroSD card is initialized, followed by a Write block (512 bytes) and a Read block operation. See [Figure 11](#) for the messages displayed consecutively on the LCD screen:

**Figure 11. MicroSD card initialization**



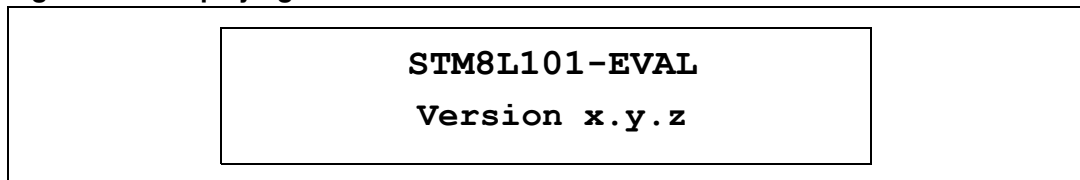
3. When this phase is complete, the message shown in [Figure 12](#) is displayed.  
By pressing the joystick to **LEFT** or **RIGHT**, the MicroSD card is read, and the string 'DEMO MICROSD' is displayed on the LCD screen, one character at a time.



**Figure 12. Reading 512 bytes from the MicroSD card**

### 3.7 About menu

This menu shows the firmware version. When this submenu is selected the message shown in [Figure 13](#) is displayed on the LCD screen:

**Figure 13. Displaying the demonstration firmware version**

**UP:** Press the joystick **UP** to exit this menu.

## 4 STM8L10x peripherals used

The following table lists the STM8L10x peripherals used in each demo:

**Table 2. Peripherals used**

| Peripheral       | Demo                      |
|------------------|---------------------------|
| GPIO             | All demos (buttons, LEDs) |
| Clock Controller | All demos                 |
| BEEPER           | Beeper demo               |
| SPI              | All demos (LCD + MicroSD) |
| TIM2             | LSI Calibration           |
| TIM3             | PWM demos (Buzzer)        |
| TIM4             | All demos (time base)     |

## 5 Demo firmware architecture

This section describes the demo firmware architecture. It is divided into two parts:

- **Library:** contains the firmware library source files. These files do not need to be modified by the user.
- **Application:** contains the specific files of the demonstration firmware that can be modified:
  - *stm8l10x\_conf.h*: this header file is used to configure the library
  - *stm8l10x\_it.h*: header for the *stm8l10x\_it.c* file
  - *stm8l10x\_it.c*: this file provides all the interrupt sub-routines
  - *stm8\_interrupt\_vector.c*: this file provides the interrupt vector table
  - *demo\_xxx.h*: header for the *demo\_xxx.c* file
  - *demo\_xxx.c*: this file provides all functions related to the xxx demo
  - *functions.h*: header for the *functions.c* file
  - *functions.c*: this file provides miscellaneous functions.
  - *joystick\_button.h*: header for the *joystick\_button.c* file
  - *joystick\_button.c*: this file provides all functions related to the management of the joystick and button
  - *mono\_lcd.h*: header for the *mono\_lcd.c* file
  - *mono\_lcd.c*: this file provides LCD management functions
  - *main.h*: header for the *main.c* file
  - *main.c*: this file provides the main function
  - *menu.h*: header for the *menu.c* file
  - *menu.c*: this file provides menu functions and menu definition

## 6 Revision history

**Table 3. Document revision history**

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 17-Apr-2009 | 1        | Initial release. |

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