



Application Note

AN_288

FT800 Demo Application - Lift Simulation

Version 1.0

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This application note is to introduce the Lift Demo Application running on both MSVC and Arduino. The objective of the Demo Application is to enable users to become familiar with the usage of the FT8XX, the design flow, and display list used to design the desired user interface or visual effect.

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1 Introduction

This application demonstrates the lift simulation using inbuilt fonts and is based on the FT8XX platform.

In this application, the commands such as flip, rotate and translate are performed on bitmaps and the audio is synchronized with this.

The application is using the bitmaps transform for rotation and zooming in and out of the fonts and the arrows bitmaps. The application also uses inbuilt fonts of the FT8XX.

1.1 Overview

The document will give the basic understanding about the bitmaps transform in the FT8XX.

For information on Project file and Source code build, please refer to [AN_391 EVE Platform Guide](#).

1.2 Scope

This document will be used by software programmers to develop GUI applications using the FT8XX with any MCU via SPI.

2 Example Circuit

2.1 Flowchart

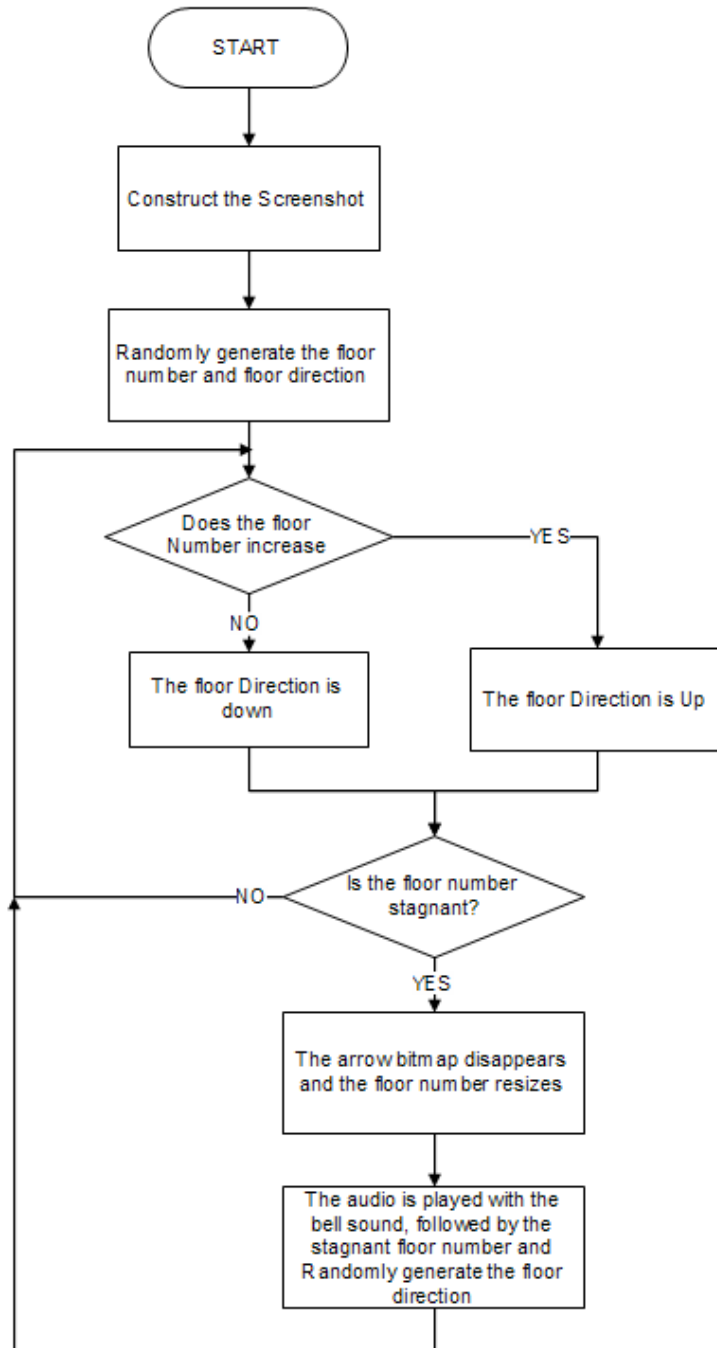


Figure 2.1 Flowchart

3 Description

3.1 Initialization

The bitmap size of floor number, floor direction and the background stars are initialized to display in the start-up screen. The bitmaps of floor number, floor direction and the background stars are in L8 format. The BRT logo which is displayed on the top left is in ARGB4 format. The running text at the bottom and the date, time display are the inbuilt fonts of the FT8XX.

3.2 Functionality

The lift simulation application is not user interactive. It runs dynamically with the randomly changing of floor numbers and floor direction. The audio is played for reaching the randomly reached floor number. This application is displayed in portrait and landscape orientations. The respective orientations are activated by enabling the following define statement in "Platform.h". The bitmap transformation is performed for the floor numbers, floor direction, the inbuilt fonts and the BRT logo bitmap. The portrait orientation is enabled by default.

```
#define ORIENTATION_PORTRAIT
```

The landscape orientation is straight forward by displaying the floor number and floor direction bitmaps. When the floor reaches the randomly generated floor number, the floor number zooms out and the floor direction is hidden which is followed by the bell sound and the audio with the floor number and the floor direction. The landscape orientation is enabled by uncommenting the "#define ORIENTATION_LANDSCAPE" statement in "Platform.h".

```
#define ORIENTATION_LANDSCAPE
```

In this application, the lift is simulated both in landscape and portrait orientations. The floor number changes with the randomly changing lift direction. The audio is integrated with the changing direction and the floor numbers. The bell audio is played when the floor reaches the randomly generated destination floor. The font bitmap resizes and is stagnant when the lift reaches the destination floor. The floor direction bitmap resizes when the floor number bitmap increases or decreases to show that the floor is moving up or down. The time and date information is displayed using the windows API. The application is in loopback mode.

The screenshot of the application is shown in portrait and landscape orientation.



Figure 3.1 Lift Simulation in Landscape Orientation

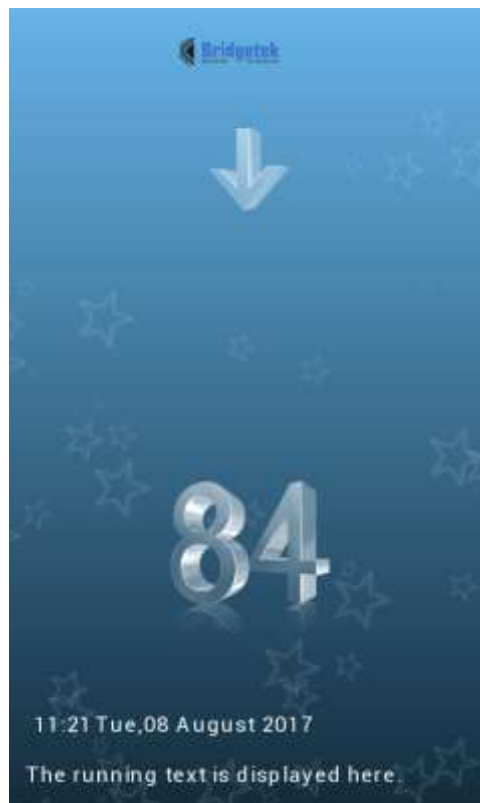


Figure 3.2 Lift Simulation in Portrait Orientation

3.2.1 Bitmaps

The application is constructed mainly with the bitmaps for fonts used for floor numbers and arrow for the destination direction. The FTDI logo is a bitmap displayed at the top of the screen.

```
/* perform inplace flip and scale of bitmap of the portrait orientation */  
App_TrsmtrxLoadIdentity(&S_GPUMatrix);  
App_TrsmtrxTranslate(&S_GPUMatrix, BWd/2.0, BHt/2.0, &temptransx, &temptransy);  
App_TrsmtrxScale(&S_GPUMatrix, (SzInc/16.0), (SzInc/16.0));  
App_TrsmtrxRotate(&S_GPUMatrix, 90);  
App_TrsmtrxTranslate(&S_GPUMatrix, (-BHt*SzInc)/32.0, (-  
BWd*SzInc)/32.0, &temptransx, &temptransy);  
App_UpdateTrsmtrx(&S_GPUMatrix, &S_GPUMtrxMatrix);
```

3.2.2 Inbuilt Fonts

The inbuilt fonts are used to display the system date and time. The running text is displayed at the bottom of the screen. The rotate and translate coprocessor commands are used to display the fonts in portrait orientations. The running text is displayed at the bottom of the screen. The inbuilt font is displayed with the specified moving speed by changing the x and y coordinates respectively.

```
/* Rotation for the font of size 28 rotated 90 degrees anticlockwise */  
  
Gpu_CoCmd_LoadIdentity(phost);  
Gpu_CoCmd_Translate(phost, 18*65536/2, 25*65536/2);  
Gpu_CoCmd_Rotate(phost, -90*65536/360);  
Gpu_CoCmd_Translate(phost, -25*65536/2, -18*65536/2);  
Gpu_CoCmd_SetMatrix(phost);
```

3.2.3 Background Graphics

The bitmap stars of six different sizes are randomly generated and are moving in the background of the gradient background. The stars move in the background to give an animation effect.

3.2.4 Integration of Audio

The audio file is loaded and played when the font bitmaps are resized, scaled. The arrow bitmap resizes when the lift is moving up or down and the audio is synchronised with the change of the floor numbers and the arrow direction. The audio file is played in one shot taking into account the time taken to change the floor number and the floor direction.

For Arduino platform, the image and audio files are placed in SD card.

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Appendix A – References

Document References

- [FT800 Embedded Video Engine Datasheet](#)
- [FT8XX Series Programmer Guide](#)
- [AN_391 EVE Platform Guide](#)
- [Datasheet for VM800B](#)
- [Datasheet for VM800C](#)

Acronyms and Abbreviations

Terms	Description
Arduino Pro	The Open Source platform variety based on the Atmel ATmega chipset
EVE	Embedded Video Engine
SPI	Serial Peripheral Interface
UI	User Interface
USB	Universal Serial Bus

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Appendix C – Revision History

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Revision	Changes	Date
1.0	Initial Release (Document migrated from FTDI to BRT - Updated copyright info; contact info; company logo; header; footer; hyperlinks to point to brt website)	2018-01-04