This document is to introduce the setup of a Restaurant Application running on MSVC. The objective of the Restaurant Application is to enable users to become familiar with the usage of the FT800, the design flow, and display list used to design the desired user interface or visual effect.

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## Table of Contents

1  Introduction .................................................................................................................. 3
   1.1  Overview.................................................................................................................. 3
   1.2  Scope ......................................................................................................................... 3

2  Application Flow ............................................................................................................. 4
   2.1  Restaurant Demo Flowchart .................................................................................... 4

3  Description .................................................................................................................... 5
   3.1  Initialization ............................................................................................................... 5
      3.1.1  Download the Bitmaps ....................................................................................... 5
      3.1.2  Set the tracker properties to Bitmaps using CMD_TRACK ................................. 5
   3.2  Functionality ............................................................................................................ 5
      3.2.1  Main Menu ......................................................................................................... 5
      3.2.2  Sub Menu .......................................................................................................... 7
      3.2.3  Order List ......................................................................................................... 9

4  Contact Information ....................................................................................................... 10

Appendix A – References ................................................................................................. 11

   Document References ................................................................................................... 11
   Acronyms and Abbreviations ......................................................................................... 11

Appendix B – List of Tables & Figures ............................................................................... 12

Appendix C – Revision History ......................................................................................... 13
1 Introduction

This application demonstrates an interactive Restaurant Demo using menu, track and rotation functions based on the FT800 platform.

The Restaurant demo user interactive function involves the menu items rotating one after another in a circular path. Items can be selected and viewed in the order list.

1.1 Overview

The document will give the basic understanding about the FT800 CPU features Track, Points and Bitmaps commands.

Arduino code of the application requires a SD card to read and load the bitmaps. The bitmaps have to be copied from the Test folder to the SD card.

1.2 Scope

This document will be used by software programmers to develop GUI applications by using FT800 with any MCU via SPI.
2 Application Flow

2.1 Restaurant Demo Flowchart

![Restaurant App FlowChart](image)

Figure 2-1 Restaurant App FlowChart
3 Description

Parameters needed to be initialized are described below for constructing the display list.

3.1 Initialization

3.1.1 Download the Bitmaps

The bitmaps are downloaded into the desired locations. The bitmap handles are also assigned here. The menus items are combined into one single image and assigned one track value. They are then called according to their cell numbers.

Note: After these configurations are set, swap the display list and flush into the J1 Memory.

3.1.2 Set the tracker properties to Bitmaps using CMD_TRACK

/* In the Function*/

```c
Ft_Gpu_CoCmd_Track(phost, 240, 136, 1, 1, tagval);
```

where ‘tagval’ – Tag value of the bitmaps.

A w and h of (1,1) means that the tracker is rotary, and reports an angle value in REG_TRACKER.

(Refer to the FT800 Programming Guide).

3.2 Functionality

The Restaurant Demo is a user interactive demo where the user can select and view items that are available.

3.2.1 Main Menu

The Main Menu has a gradient as the background. Then two points are drawn with an X vertex equal to the Mid value of the screen width and a Y vertex of -150.

The first point is black in colour with reduced alpha value of 50 and point size of 250. The second point is red in colour with default alpha value and a point size of 135.

The Main Menu has options like Beverages, Pastries and Frappe. The user can touch the screen at any point if they want to stop the rotation. The preferred option can then be selected by clicking on it.

The Main menu bitmaps are all combined together into a single file. These are accessed using their cell numbers. They are of RGB565 format.
The bitmaps of the menu items are placed in an elliptical path around the points. Each of the items has its individual track to monitor its movement. They are reduced or increased in size based on their current positions using BITMAP_TRANSFORM as shown in the code below.

```
xoff = 200+(ft_int16_t)(190*cos(theta*0.0174));
yoff = -20+(ft_int16_t)(150*sin(theta*0.0174));
zinout = 310 - yoff;
Ft_App_WrCoCmd_Buffer(phost,BITMAP_TRANSFORM_A(zinout)); /* bitmap size adjustment */
Ft_App_WrCoCmd_Buffer(phost,BITMAP_TRANSFORM_E(zinout)); /* bitmap size adjustment */
Ft_App_WrCoCmd_Buffer(phost, VERTEX2F(xoff*16,yoff*16));
Ft_App_WrCoCmd_Buffer(phost,BITMAP_SIZE(BILINEAR, BORDER, BORDER, 256*80/zinout, 256*53/zinout ));
```
3.2.2 Sub Menu

The Main Menu option selection opens up the respective Sub Menu. The Sub Menu items also rotate in the same fashion.

The Sub Menu also has a gradient background. The two points are drawn with a X vertex equal to the Mid value of the screen width and a Y vertex of -150.

The first point is black in colour with a reduced alpha value of 50 and a point size of 250. The second point is red in colour with default alpha value of 255 and point size of 135.

There is a shopping cart bitmap which at the beginning moves from the right to the centre of the screen by varying the X co-ordinates of the Cart bitmap.

The touch of an item in the submenu opens up the description window.

The Sub menu bitmaps are all combined together into a single file (as seen in Figure 3-1).

NOTE: Combining individual bitmaps into one file requires an external tool such as GIMP and is outwith the scope of this app note. Note also that to ensure correct stride/height calculations, the bitmaps should be arranged vertically.

These bitmaps are accessed using their cell numbers. They are of RGB565 format. The bitmaps are reduced or increased in size based on their current positions using BITMAP_TRANSFORM.

Items can be dragged and placed on the shopping cart. This is done by using points and tracing the path using the Touch screen register values as shown below.

```c
Ft_App_WrCoCmd_Buffer(phost,BEGIN(FTPOINTS));
Ft_App_WrCoCmd_Buffer(phost,POINT_SIZE(5*16));
sx = Ft_Gpu_Hal_Rd16(phost,REG_TOUCH_SCREEN_XY+2);
sy = Ft_Gpu_Hal_Rd16(phost,REG TOUCH SCREEN_XY);
if(sx != -32768)
    Ft_App_WrCoCmd_Buffer(phost,VERTEX2F(sx*16,sy*16));
```

The addition of an item in the shopping cart can be seen by the presence of the points in the cart. The points in the shopping cart are pre calculated in an array and they are used as shown below based on the number of items selected.
The price and description of the items can be seen by clicking on the image which opens the description window as shown below.

![Description Window](image)

**Figure 3-3 Description Window**

The order list at the bottom of the screen is of ARGB4 format, and has the list of items that are selected.

The back and home buttons at the bottom left of the screen are of ARGB4 format. These buttons disappear after a pre-defined time out. They can be enabled again by clicking on the bottom area of the screen.

![Sub Menu Window](image)

**Figure 3-4 Sub Menu Window**
3.2.3 Order List

The Order list also has the same background as the other two windows.

The Order List has the list of the items that has been added to the shopping cart. Items can be increased or decreased in quantity by clicking the respective buttons.

The plus and minus button are characters that are placed using VERTEX2II command. These are then assigned tags.

The total price of the order is also shown.

The back and home buttons are placed at the bottom left of the screen. These buttons disappear after a pre-defined time out. They can be enabled again by clicking on the bottom area of the screen.

This window can also be scrolled. The scrolling is achieved by reading the REG_TOUCH_SCREEN_XY Registers and by calculating its velocity as shown below.

```c
signed short sy = Ft_Gpu_Hal_Rd16(phost,REG_TOUCH_SCREEN_XY);
if ((sy != -32768) && (scroller.dragprev != -32768)) {
    scroller.vel = (scroller.dragprev - sy) << 4;
} else {
    int change = max(1, abs(scroller.vel) >> 5);
    if (scroller.vel < 0)
        scroller.vel += change;
    if (scroller.vel > 0)
        scroller.vel -= change;
}
scroller.dragprev = sy; /* previous touch */
scroller.base += scroller.vel;
scroller.base = max(0, min(scroller.base, scroller.limit));
```

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Espresso</td>
<td>+1</td>
<td>3</td>
</tr>
<tr>
<td>Walnut Frappe</td>
<td>+1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

![Figure 3-5 Order List Screen](image-url)
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Appendix A– References

Document References

1. Datasheet for VM800C
2. Datasheet for VM800B
3. FT800 programmer guide.
4. FT800 Embedded Video Engine Datasheet

Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Terms</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPI</td>
<td>Serial Peripheral Interface</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
</tbody>
</table>
Appendix B – List of Tables & Figures

Figure 2-1 Restaurant App FlowChart ................................................................. 4
Figure 3-1 Menu Items ...................................................................................... 6
Figure 3-2 Main Menu Screen .......................................................................... 7
Figure 3-3 Description Window ....................................................................... 8
Figure 3-4 Sub Menu Window .......................................................................... 8
Figure 3-5 Order List Screen ........................................................................... 9
### Appendix C - Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Changes</th>
<th>Date</th>
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<tr>
<td>1.0</td>
<td>Initial release</td>
<td>2014-03-25</td>
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