Application Note

AN_307

FT800 Restaurant Application

Version 1.0

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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.

Future Technology Devices International Limited (FTDI)
Unit 1, 2 Seaward Place, Glasgow G41 1HH, United Kingdom
Tel.: +44 (0) 141 429 2777 Fax: + 44 (0) 141 429 2758
Web Site: http://ftdichip.com

Table of Contents

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

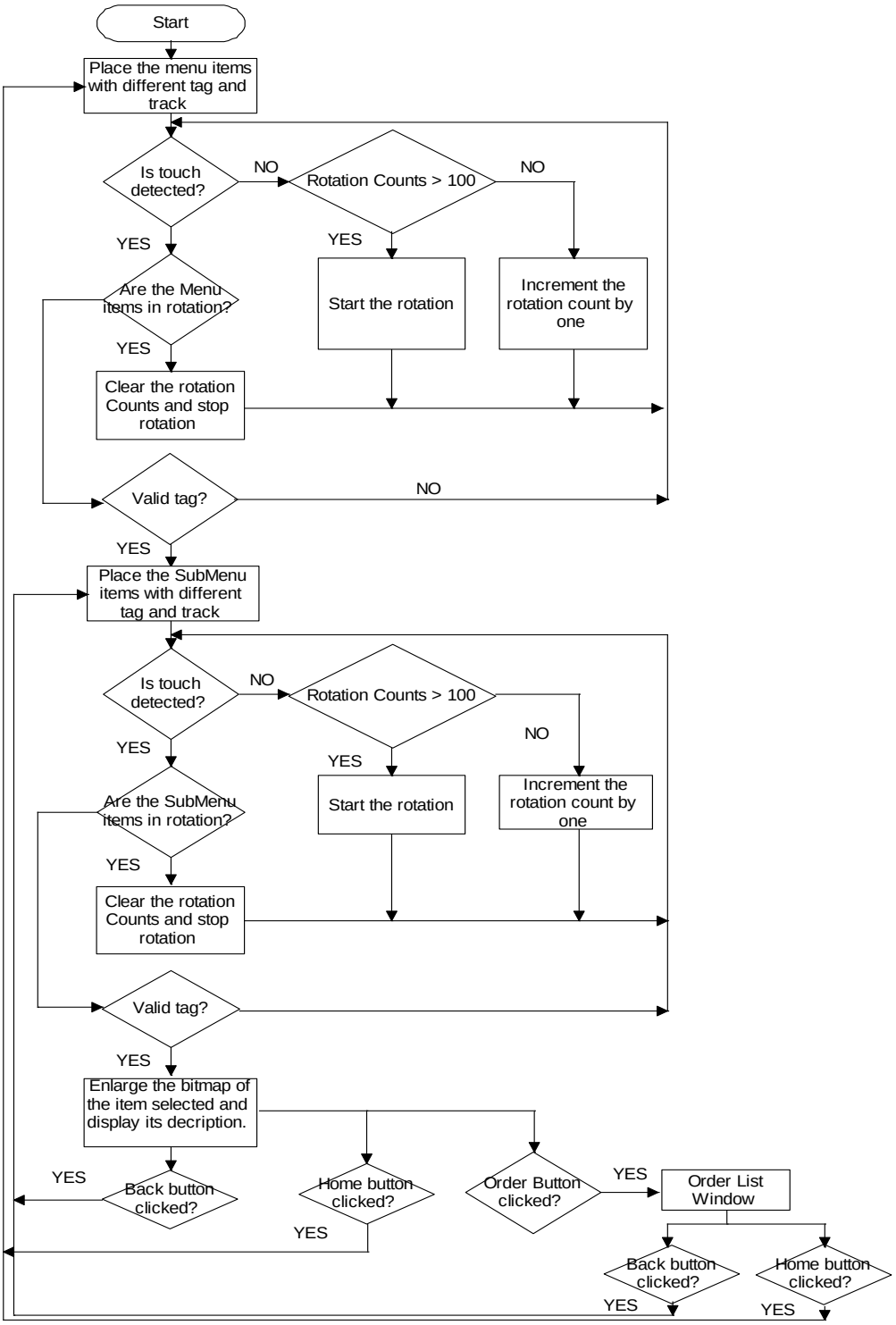

Figure **2-1 Restaurant App FlowChart**

3 Description

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

3.1 Intialization

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*/

```
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.

Figure 3-1 Menu Items

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  ));
```

Figure 3-2 Main Menu Screen

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 vertivcally.

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.

```
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.

```
Ft_App_WrCoCmd_Buffer(phost,COLOR_RGB(0,255,0));
Ft_App_WrCoCmd_Buffer(phost,BEGIN(FTPOINTS));
Ft_App_WrCoCmd_Buffer(phost,POINT_SIZE(3*16));
Ft_App_WrCoCmd_Buffer(phost,VERTEX2F(points_cdsX[k]*16,points_cdsY[k]*16) );
```

The price and description of the items can be seen by clicking on the image which opens the description window as shown below.

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.

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.

```
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));
```

Figure 3-5 Order List Screen

4 Contact Information

Head Office – Glasgow, UK

Future Technology Devices International Limited
Unit 1, 2 Seaward Place, Centurion Business Park
Glasgow G41 1HH
United Kingdom
Tel: +44 (0) 141 429 2777
Fax: +44 (0) 141 429 2758

E-mail (Sales) sales1@ftdichip.com
E-mail (Support) support1@ftdichip.com
E-mail (General Enquiries) admin1@ftdichip.com

Branch Office – Tigard, Oregon, USA

Future Technology Devices International Limited
(USA)
7130 SW Fir Loop
Tigard, OR 97223-8160
USA
Tel: +1 (503) 547 0988
Fax: +1 (503) 547 0987

E-Mail (Sales) us.sales@ftdichip.com
E-Mail (Support) us.support@ftdichip.com
E-Mail (General Enquiries) us.admin@ftdichip.com

Branch Office – Taipei, Taiwan

Future Technology Devices International Limited
(Taiwan)
2F, No. 516, Sec. 1, NeiHu Road
Taipei 114
Taiwan , R.O.C.
Tel: +886 (0) 2 8791 3570
Fax: +886 (0) 2 8791 3576

E-mail (Sales) tw.sales1@ftdichip.com
E-mail (Support) tw.support1@ftdichip.com
E-mail (General Enquiries) tw.admin1@ftdichip.com

Branch Office – Shanghai, China

Future Technology Devices International Limited
(China)
Room 1103, No. 666 West Huaihai Road,
Shanghai, 200052
China
Tel: +86 21 62351596
Fax: +86 21 62351595

E-mail (Sales) cn.sales@ftdichip.com
E-mail (Support) cn.support@ftdichip.com
E-mail (General Enquiries) cn.admin@ftdichip.com

Web Site

http://ftdichip.com

Distributor and Sales Representatives

Please visit the Sales Network page of the FTDI Web site for the contact details of our distributor(s) and sales representative(s) in your country.

Appendix A– References

Document References

1. Datasheet for VM800C
   http://www.ftdichip.com/Support/Documents/DataSheets/Modules/DS_VM800C.pdf
2. Datasheet for VM800B
   http://www.ftdichip.com/Support/Documents/DataSheets/Modules/DS_VM800B.pdf
3. FT800 programmer guide.
   http://www.ftdichip.com/Support/Documents/ProgramGuides/FT800%20Programmers%20Guide.pdf
4. FT800 Embedded Video Engine Datasheet
5. http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT800.pdf

Acronyms and Abbreviations

Terms	Description
SPI	Serial Peripheral Interface
GUI	Graphical User Interface

Appendix B – List of Tables & Figures

Appendix C– Revision History

Document Title: AN_307 FT800 Restaurant Application

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Product Page: http://www.ftdichip.com/FTProducts.htm

Document Feedback: Send Feedback

Revision	Changes	Date
1.0	Initial release	2014-03-25