XUI Programming Guide

V 2.0.0

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Revision History

Date	Version	Note	Author
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1 Introduction

1.1 Purpose

In contrast to the GUI, XUI is relatively easier to understand and use, it is suitable for developing the Wizard-style interface. Such as POS machine, handhold terminal, ATM, and so on customer-oriented terminals in public place.

XUI cannot implement a variety of special effects as the complicated GUI, but in Wizard-style interface, it needs the simple and efficient GUI.

To put it simply, XUI programming is to draw and write by some keys.

1.2 Function

The functions of XUI list as following:

- Supports black-and-white screen.
- Supports monochrome font and gray font.
- Supports touch screen.
- Supports graphical display.
- Supports multi-font display.
- Supports bidirectional text display.
- Supports translucent. (Alpha Channel)
- Supports screenshot.
- Supports output the screenshot to printer, that means implement the unity of the display interface and print interface.

- Supports multi-platform, including Linux framebuffer, X11, SDL, windows, android, ios, but not limited to. And without operation system.
- Supports rotational screen.

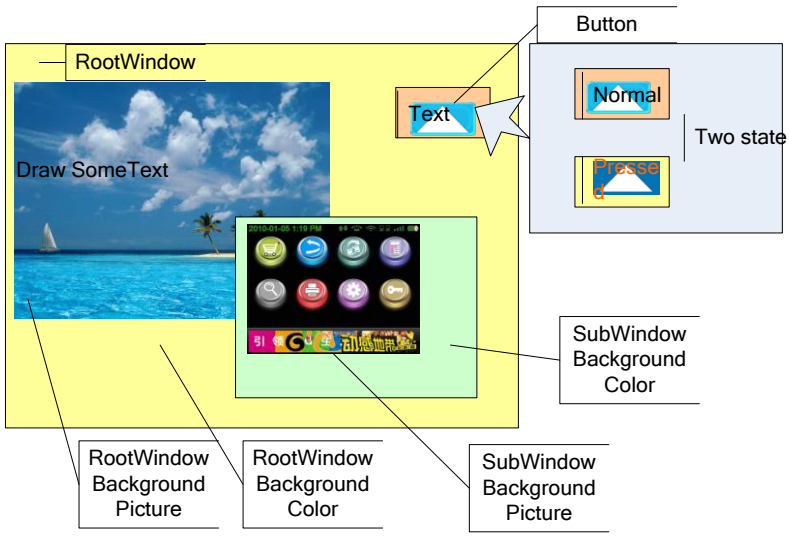
1.3 Feature

- Imperative programming interface.
- An unification of screen buttons and physical keys.

1.4 Thinking in XUI

How to make the XUI API? For users, they always want to use the simpler programming to make the cooler interface, but the result is contradictory. So we try to give a more balanced solution.

Firstly, see the design of the interface,



Design ideas shown as follow:

It only has three concepts of canvas, button and key value.

Canvas

- It can have sub-canvas.
- Text and picture can be painted on the canvas, and the buttons are also on the canvas.
- It contains background picture and background color, the background will not be cleared when CLS.
- It must have a RootCanvas.

Button

- Buttons contains two states, normal and pressed.
- Each state including the following parameters: border, background color, icon, text font, text color and text content.
- Parameter value of the button is set as “key”, when clicking it, users can get the key value by function GetKey (). The button value and physical key value are in the same queue.

Key value

- The button value and key value are in the same queue.
- All windows have only one queue.
- Not applicable to multithreading.
- So when programming you just need to paint on the canvas, if needs dialog box, display a sub-canvas, and close it after use.
- For printer, only needs to create a hidden canvas for writing, and then sending a canvas capture to the printer.

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2 Macro and Struct

2.1 Definition of Key values

Table 1 Definition of Key values

Macro	Value	Description
#define **XUI_KEY1**	2	/* 1 */
#define **XUI_KEY2**	3	/* 2 */
#define **XUI_KEY3**	4	/* 3 */
#define **XUI_KEY4**	5	/* 4 */
#define **XUI_KEY5**	6	/* 5 */
#define **XUI_KEY6**	7	/* 6 */
#define **XUI_KEY7**	8	/* 7 */
#define **XUI_KEY8**	9	/* 8 */
#define **XUI_KEY9**	10	/* 9 */
#define **XUI_KEY0**	11	/* 0 */

#define **XUI_KEYCANCEL**	223	/* Cancel */
#define **XUI_KEYCLEAR**	14	/* Clear */
#define **XUI_KEYENTER**	28	/* Enter */
#define **XUI_KEYALPHA**	69	/* Alpha */
#define **XUI_KEYF1**	59	
#define **XUI_KEYFUNC**	102	
#define **XUI_KEYUP**	103	
#define **XUI_KEYDOWN**	108	
#define **XUI_KEYMENU**	139	

2.2 Macro Definition

Table 2 Macro Definition

Macro	Description
b	*Blue channel*
g	*Green channel*
r	*Red channel*
a	*ALPHA channel*

Table 3 XuiTransform Rotate

Macro	Description
XUI_ROTATE_0	*Without rotating*
XUI_ROTATE_90	*rotating clockwise by 90degrees*
XUI_ROTATE_180	*rotating clockwise by 180degrees*
XUI_ROTATE_270	*rotating clockwise by 270degrees*

XUI_FLIP_VERT	*flip vertical*
XUI_FLIP_HORIZ	*flip horizontal*

Table 4 XuiButtonStatType

Macro	Description
XUI_BTN_NORMAL	*Normal state*
XUI_BTN_PRESSED	*Pressed State*

Table 5 XuiBgStyle

Macro	Description
XUI_BG_NORMAL	*Normal, display the picture from the origin x, y.*
XUI_BG_TILE	*Tile*
XUI_BG_CENTER	*Center*
XUI_BG_FOUR_CORNER	*Stretch to four corner*

Table 6 XuiFontSet

Macro	Description
XUI_FONT_MONO	*Monochrome font(black and white)*
XUI_FONT_GREY	*Grey font*

Table 7 XuiTextStyle

Macro	Description
XUI_TEXT_NORMAL	*Normal*

XUI_BOLD	*Bold*
XUI_ITALIC	*Italic*
XUI_TEXT_BOLD_ITALIC	*Bold and italic*

Table 8 XuiSigPenFlat

Macro	Description
XUI_SIG_FLAT	*Signing Board with smooth processing*
XUI_SIG_NORMAL	*The normal Signing Board without smooth processing*

Table 9 XuiWindowType

Macro	Description
XUI_WIN_CANVAS	*Canvas window*
XUI_WIN_BUTTON	*Button window*
XUI_WIN_GIF	*Gif window*
XUI_WIN_SIGBOARD	*Signing Board window*

2.3 Other Macro Definition

#define *XUI_RIGHT_X(_x, _width, _extend)*

Get text in the right-most position within _width（text-align right）

#define *XUI_CENTER_X(_x, _width, _extend)*

Get text in the middle position within _width（text-align horizontal center）

#define *XUI_CENTER_Y(_y, _height, _extend)*

Get text in the middle position within _height (text-align vertical center)

2.4 Structure

Structure XuiWindow

Table 10 Structure XuiWindow

Structure	Description
width	*the window width*
height	*the window height*
widget	*the window widget*
type	*Window type*
key	*Key values related to the window*

Structure XuiImg

Table 11 Structure XuiImg

Structure	Description
width	*Img width*
height	*Img height*
priy	*Img data pointer*

Structure XuiButtonStat

Table 12 Structure XuiButtonStat

Structure	Description
btn_round	*rounded corner（0 means has no rounded corner, 1 means has rounded corner, and the default value is 0）*
btn_bg	*background color*
Text	*text*
text_fg	*text color*
text_font	*text font*
text_x	*text position:x*
text_y	*text position:y*
text_height	*text height(font size)*

Img	*Image*
img_x	*Image position:x*
img_y	*Image position:y*
img_style	*Image type*

Structure XuiSigBoardStat

Table 13 Structure XuiSigBoardStat

Structure	Description
btn_round	*rounded corner（0 means has no rounded corner, 1 means has rounded corner, and the default value is 0）*
btn_bg	*Background color（Does not support transparent）*
text	*text*
text_fg	*text color*
text_font	*text font*
text_x	*Text position: x*
text_y	*Text position: y*
text_height	*Text height(font size)*
img	*Image*
img_x	*Image position: x*
img_y	*Image position: y*
img_style	*image type*
pen_fg	*pen color*
pen_width	*Pen width（ranges from 1 to 10）*
pen_flat	*Pen with flat processing*

Structure XuiImeAttr

Table 14 Structure XuiImeAttr

Structure	Description
parent	*Parent canvas（valid canvas pointer）*
x	*IME position x（greater than 0）*
y	*IME position y（greater than 0）*
width	*IME width（greater than 0）*
height	*IME height（greater than 4*（text_size+10））*
text_font	*IME text font（valid font pointer）*
text_size	*IME text size（greater than 12）*
text_fg	*IME text color*
focus_fg	*IME select the switched color*
img	*IME background image*

Structure XuiGetStrAttr

Table 15 Structure XuiGetStrAttr

Structure	Description
parent	*Parent canvas（valid canvas pointer）*
x	*Inputting position x（greater than 0）*
y	*Inputting position y（greater than 0）*
font	*Inputting text font（valid font pointer）*
size	*Inputting text size（greater than 12）*
fg	*Inputting text color*

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3 XUI API

3.1 XuiOpen

Prototype	**int XuiOpen(int argc, char **argv);**	
Function	Open XUI and initialize it.	
Parameters	argc【Input】	Number of arguments
	argv【Input】	Arguments list
Return	0	Success
	< 0	Fail
Instruction	The format supported for argv list as below: FB=xxxxx. Device node of framebuffer, the default is "/dev/graphics/fb0". INPUT=xxxx Input can have multiple device nodes, the default is "/dev/input/event0". ROTATE=xxx Screen rotation (0,90,180, the default value is 0, using the default value when value is invalid） TSDEV=xxxx Device node of touch screen, the default is "/dev/input/event2". STATUSBAR=xxx Height of the status bar(0-64，the default value is 0, using the default	

	value when value is invalid) For example： **char** *xui_argv[] = {"ROTATE=90","STATUSBAR=18"}; XuiOpen(**sizeof**(xui_argv)/**sizeof**(xui_argv[0]), xui_argv);
Note	1. When called XuiOpen for multiple times, only the first time takes effect, the later calls will not work unless calling XuiClose. 2. When argc=0, argv=NULL, it will enable the default settings. 3. Xui does not support multi-process, when call XuiOpen in that case, they will grab screen during operation on canvas. 4. Arguments in argv are independent of each other. 5. For argv, after set the ROTATE arguments, the left upper corner of the screen was defined as coordinate origin of the subsequent operations for API. 6. Other functions can take effect only after call Xuiopen successfully.

3.2 XuiIsRunning

Prototype	**int XuiIsRunning(void);**	
Function	Check if the XUI is running.	
Parameters	None	
Return	1	running
	0	Not running.
Instruction		

3.3 XuiClose

Prototype	**void XuiClose(void);**	
Function	Close the XUI.	
Parameters	None	
Return	None	
Instruction	Call this function when the application exits.	

3.4 XuiSuspend

Prototype	**int XuiSuspend (void);**
Function	Suspend the XUI.

Parameters	None	
Return	0	Success
	-1	Fail
Instruction	When the application needs to call the other process and it also occupied resource of fb and event, and then should call this function to release resource. Otherwise, there will be two processes to operate fb and receive event at the same time.	
Note	1. After the suspension, it needs to call XuiResume () to resume operation.	

3.5 XuiResume

Prototype	**int XuiResume (void);**	
Function	Resume running the XUI.	
Parameters	None	
Return	0	Success
	-1	Fail
Instruction	Resume the running status from the suspended state. After called XuiSuspend, it is no longer to receive keystrokes or touch events, so it cannot response to the XuiResume (), but can only active resume in program.	

3.6 XuiRootCanvas

Prototype	**XuiWindow *XuiRootCanvas(void);**	
Function	Get the RootCanvas.	
Parameters	None	
Return	NULL	Error getting
	else	Pointer of the RootCanvas
Instruction	Call this function when requires to operate on the RootCanvas. For example: XuiWindow* root; root= XuiRootCanvas(); XuiCanvasSetBackground(root,XUI_BG_NORMAL,img_bg,color_bg);	

3.7 XuiStatusbarCanvas

Prototype	**XuiWindow * XuiStatusbarCanvas (void);**	
Function	Get the Canvas of StatusBar.	
Parameters	None	
Return	NULL	Error getting
	else	Pointer of the status bar canvas
Instruction	Same as XuiRootCanvas ().	

3.8 XuiCreateFont

Prototype	**XuiFont *XuiCreateFont(char *fontfile, int index, XuiFontSet fontset);**	
Function	Create the font.	
Parameters	fontfile 【Input】	Path of the font file.
	index 【Input】	Index of the font file.
	Fontset 【Input】	Font style, it supports monochrome and grey modes. Details see XuiFontSet.
Return	NULL	Error getting
	else	Font pointer
Instruction	Call this function to create font when requires to display text. For Example: XuiFont *font_simsun_0; font_simsun_0 = XuiCreateFont("/usr/font/paxfont.ttf", 0, 0);	
Note	1. Support the custom font and ttc/ttf vector font. 2. According to the fontfile, firstly, matches custom font by default, if not, determine whether it is the ttf or ttc, if both are not, returns NULL. 3. The arguments index takes effect only when using the ttc font; it is used to distinguish the font number. The index is invalid to custom font and ttf font since there is only one font. 4. Users can call XuiDestroyFont () to destroy the created fonts which are no longer need to use. 5. The custom font is created by fontextract, it can create highly customizable bitmap fonts.	

3.9 XuiDestroyFont

Prototype	**void XuiDestroyFont(XuiFont *font);**	
Function	Destroy fonts.	
Parameters	font【Input】	Font pointer
Return	None	
Instruction	Destroy the fonts which created by XuiCreateFont ().	

3.10 XuiCanvasDrawText

Prototype	**int XuiCanvasDrawText(XuiWindow *window, unsigned int x, unsigned int y, unsigned int height, XuiFont *font, XuiTextStyle textstyle, XuiColor fg, char *text);**	
Function	Display character string on the window canvas.	
Parameters	window 【Input】	Canvas
	x 【Input】	The position x which relative to window canvas
	y 【Input】	The position y which relative to window canvas
	height 【Input】	Text height
	font 【Input】	Font, created by XuiCreateFont
	textstyle 【Input】	Text style(bold, italic), details see the **XuiTextStyle**
	fg 【Input】	Font color
	text 【Input】	Text (utf-8 encoding)
Return	0	Success

	< 0	Fail
Instruction	1. Does not support auto linefeed or \n, \r linefeed. When the displayed length is beyond the canvas, the excess part will not display. 2. Text only supports utf-8 encoding; other formats should be converted to utf-8 code to display properly. 3. Window must be a valid canvas pointer, or it will lead to a crash. The functions mentioned below are the same as it.	

3.11 XuiCanvasDrawImg

Prototype	**int XuiCanvasDrawImg(XuiWindow *window, unsigned int x, unsigned int y, unsigned int width, unsigned int height, XuiBgStyle bgstyle, XuiImg *img);**		
Function	Display images on the window canvas.		
Parameters	window	【Input】	Canvas
	x	【Input】	The position x which relative to window canvas
	y	【Input】	The position y which relative to window canvas
	width	【Input】	Image width
	height	【Input】	Image height
	bgstyle	【Input】	Background style, details see the **XuiBgStyle**.
	img	【Input】	Image pointer
Return	0		Success
	< 0		Fail
Instruction	img must be the valid image pointer created by		

	XuiImgLoadFormFile, otherwise the image may not show correctly.

3.12 XuiCanvasDrawRect

Prototype	**int XuiCanvasDrawRect(XuiWindow *window, unsigned int x, unsigned int y, unsigned int width, unsigned int height, XuiColor fg, int round, int fill);**	
Function	Display rectangle on the window canvas.	
Parameters	window 【Input】	Canvas
	x 【Input】	The position x which relative to window canvas
	y 【Input】	The position y which relative to window canvas
	width 【Input】	Rectangle width
	height 【Input】	Rectangle height
	Fg 【Input】	Foreground color
	round 【Input】	1- rounded 0- rectangular
	fill 【Input】	1- filled 0- hollowed
Return	0	Success
	< 0	Fail
Instruction		

3.13 XuiClearArea

Prototype	**int XuiClearArea(XuiWindow *window, unsigned int x,**

	unsigned int y, **unsigned int width,** **unsigned int height);**	
Function	Clear the canvas area and display the background color.	
Parameters	window 【Input】	Canvas
	x 【Input】	The position x which relative to window canvas
	y 【Input】	The position y which relative to window canvas
	width 【Input】	Cleared width
	height 【Input】	Cleared height
Return	0	Success
	< 0	Fail
Instruction	When multiple canvases overlapped, only clear the area which specified by window.	

3.14 XuiTextWidth

Prototype	**int XuiTextWidth(XuiFont *font,** **int size,** **char *text);**	
Function	Get the text width.	
Parameters	font 【Input】	The specified font which created by XuiCreateFont
	size 【Input】	Font size
	text 【Input】	Text string
Return	Returns the string width.	
Instruction	Use it when set text for center or right alignment.	
Note	1. Font must be valid and created by XuiCreateFont; otherwise, it will cause programs to crash.	

	2. Text must be a valid string pointer. 3. It only supports utf-8 encoding; other formats need to be converted to utf-8 code firstly.

3.15 XuiCreateCanvas

Prototype	**XuiWindow *XuiCreateCanvas(XuiWindow *parent, unsigned int x, unsigned int y, unsigned int width, unsigned int height);**	
Function	Create canvas.	
Parameters	parent 【Input】	Parent canvas
	x 【Input】	The position x which relative to window canvas
	y 【Input】	The position y which relative to window canvas
	width 【Input】	Canvas width
	height 【Input】	Canvas height
Return	NULL	Fail
	else	Canvas pointer
Instruction	1. Parent must be a valid canvas pointer; the interfaces mentioned below should be the same as it. 2. The new canvas will be displayed on the screen by calling XuiShowWindow (), and the parent canvas will be covered.	

3.16 XuiDestroyWindow

Prototype	**void XuiDestroyWindow(XuiWindow *window);**	
Function	Destroy the window.	
Parameters	window 【Input】	window

Instruction	Destroy windows which created by XuiCreateCanvas(), XuiCreateButton(), XuiCreateSinatureBoard() and XuiCreateGif().
Note	Users should follow the principle: First create last destroyed, last create first destroyed.

3.17 XuiShowWindow

Prototype	**void XuiShowWindow(XuiWindow *window, int show, int flag);**	
Function	Show or hide the window.	
Parameters	window 【Input】	window
	show 【Input】	1- show 0- hide
	flag 【Input】	Extended parameter, it is unused, fill in 0.
Return	None	
Instruction		

3.18 XuiCanvasSetBackground

Prototype	**void XuiCanvasSetBackground(XuiWindow *window, XuiBgStyle bgstyle, XuiImg *img, XuiColor bg);**	
Function	Set the canvas background.	
Parameters	window 【Input】	Canvas
	bgstyle 【Input】	Background style. Details see the **XuiBgStyle**.
	img 【Input】	Image, NULL indicates has no image.
	bg	Background color.
Return	None	

Instruction	It will clear the screen.
Note	1. This interface only takes effects to the specified canvas. 2. It does not support transparent in the background.

3.19 XuiCreateButton

Prototype	**XuiWindow *XuiCreateButton(XuiWindow *parent, unsigned int x, unsigned int y, unsigned int width, unsigned int height);**	
Function	Create button in canvas.	
Parameters	parent 【Input】	Parent canvas
	x 【Input】	The position x which relative to window canvas
	y 【Input】	The position y which relative to window canvas
	width 【Input】	width
	height 【Input】	height
Return	NULL	Fail
	else	Button pointer
Instruction		

3.20 XuiButtonSetStat

Prototype	**int XuiButtonSetStat(XuiWindow *window, XuiButtonStatType type, XuiButtonStat *stat);**	
Function	Set the button state.	
Parameters	window 【Input】	Button

	type 【Input】	state
	stat 【Input】	state variable
Return	0	Success
	< 0	Fail
Instruction	It will take effect immediately after setting by XuiButtonSetStat().	
Note	Stat must be a valid state pointer, otherwise, it will lead to crashes. Interfaces mentioned below should be the same as it. When text_font and text are NULL, the function can return correctly, but doesn't show the text.	

3.21 XuiButtonSetKey

Prototype	**int XuiButtonSetKey(XuiWindow *window, int key);**	
Function	Set the key value of the button.	
Parameters	window 【Input】	Button
	key 【Input】	Key value (key>0)
Return	0	Success
	< 0	Fail
Instruction	1. After release the button, you can get key values by XuiGetKey(). 2. The value associate with the button must be greater than 0.	

3.22 XuiCreateSignatureBoard

Prototype	**XuiWindow * XuiCreateSignatureBoard (XuiWindow *parent, unsigned int x, unsigned int y, unsigned int width, unsigned int height);**
Function	Create the signature board.

Parameters	parent 【Input】	Parent canvas
	x 【Input】	The position x which relative to window canvas
	y 【Input】	The position y which relative to window canvas
	width 【Input】	width
	height 【Input】	height
Return	NULL	Fail
	else	Pointer of the signature board
Instruction	When create signature board, there cannot be multiple canvases overlapped.	

3.23 XuiSigBoardSetStat

Prototype	**int XuiSigBoardSetStat (XuiWindow *window, XuiSigBoardStat *stat);**	
Function	Set the state of signature board.	
Parameters	window 【Input】	Signature board
	stat 【Input】	State variable, details refer to the structure XuiSigBoardStat.
Return	0	Success
	< 0	Fail
Instruction	1. It will take effect immediately after setting by XuiSigBoardSetStat(). 2. For stat arguments, when the pen_flat is XUI_SIG_FLAT, it does not support change the pen color and pen width. 3. When text_font and text are NULL, the function can return correctly, but doesn't show the text.	

	4. The background of signature board does not support translucent.

3.24 XuiSigBoardImg

Prototype	**XuiImg * XuiSigBoardImg(XuiWindow *window);**	
Function	Get the signature image.	
Parameters	window 【Input】	Signature board
Return	NULL	Fail
	else	Image pointer
Instruction	After using, call the XuiImgFree to destroy the image.	

3.25 XuiCreateGif

Prototype	**XuiWindow * XuiCreateGif (XuiWindow *parent, unsigned int x, unsigned int y, unsigned int width, unsigned int height , const char* path);**	
Function	Create the gif animations.	
Parameters	parent 【Input】	Parent canvas
	x 【Input】	The position x which relative to window canvas
	y 【Input】	The position y which relative to window canvas
	width 【Input】	width
	height 【Input】	height
	path 【Input】	path of Gif image
Return	NULL	Fail

	else	Pointer of gif window
Instruction		

3.26 XuiHasKey

Prototype	**int XuiHasKey(void);**	
Function	Check it whether has key.	
Parameters	None	
Return	1	yes
	0	no
Instruction		

3.27 XuiGetKey

Prototype	**int XuiGetKey(void);**	
Function	Get the key.	
Parameters	None	
Return	Keys	
Instruction	This function will wait till has a key to return.	

3.28 XuiClearKey

Prototype	**void XuiClearKey(void);**	
Function	Get the key buffer.	
Parameters	None	
Return	None	
Instruction	Clear the keys buffer queue, this buffer is a dynamic linked list and has no fixed length.	

3.29 XuiCaptureScreen

Prototype	**XuiImg *XuiCaptureScreen(void);**	
Function	Capture the screen.	
Parameters	None	
Return	NULL	Fail
	else	Pointer of image
Instruction	After using, call XuiImgFree() to destroy the screenshot.	

3.30 XuiCaptureCanvas

Prototype	**XuiImg *XuiCaptureCanvas(XuiWindow *window, unsigned int x, unsigned int y, unsigned int width, unsigned int height);**	
Function	Capture the canvas.	
Parameters	window 【Input】	canvas
	x 【Input】	The starting position x which relative to window canvas
	y 【Input】	The starting position y which relative to window canvas
	width 【Input】	width
	height 【Input】	height
Return	NULL	Fail
	else	Pointer of image
Instruction	After using, call XuiImgFree() to destroy the image. It will not capture the Button on the canvas. It is also applicable to the hidden canvas. This function can generate images for printer.	

	If the width and height are greater than the width and height of canvas, the generated image is defined as the value, whichever is the minimum.

3.31 XuiImgLoadFormFile

Prototype	**XuiImg *XuiImgLoadFormFile(const char *file);**	
Function	Load the image from a file.	
Parameters	file 【Input】	The file path.
Return	NULL	Fail
	else	Pointer of image
Instruction	Currently only supports bmp and png.	

3.32 XuiImgSaveToFile

Prototype	**int XuiImgSaveToFile(XuiImg *img, const char *file);**	
Function	Save the image to a file.	
Parameters	img 【Input】	Image pointer
	file 【Input】	The file path of the image to be saved
Return	0	Success
	< 0	Fail
Instruction	Currently it only supports png.	

3.33 XuiImgToRgba

Prototype	**int XuiImgToRgba(XuiImg *img, const char *rgba);**	
Function	Save the image to the rgba buffer.	
Parameters	img 【Input】	Image pointer

	rgba 【Input】	rgba buffer.
Return	0	Success
	< 0	Fail
Instruction	1. It does not check the buffer size, please distribute the buffer size of 4* width * height. 2. Img must be a valid XuiImg pointer; the follows should be the same.	

3.34 XuiImgTransform

Prototype	**int XuiImgTransform(XuiImg *img, XuiTransform transform);**	
Function	Transform images.	
Parameters	img 【Input】	Image pointer
	transform 【Input】	Transform mode. See the macro **XuiTransform**.
Return	0	Success
	< 0	Fail
Instruction		

3.35 XuiImgFree

Prototype	**void XuiImgFree(XuiImg *img);**	
Function	Destroy the image.	
Parameters	img 【Input】	Image pointer
Return	None	
Instruction		

3.36 XuiSetStatusbarIcon

Prototype	**int XuiSetStatusbarIcon(int index, const char* path);**	
Function	Set the status bar icon.	
Parameters	index 【Input】	The specified icon labels, from left to right is 0-7.
	path 【Input】	Image path. NULL means do not display the icon.
Return	0	Success
	-1	Fail
Instruction	1. It takes effect after set STATUSBAR by the parameter argv of XuiOpen.(that means has set the height of the status bar) 2. When the path is NULL or wrong, the original icon will be hidden.	

3.37 XuiGetHzString

Prototype	**int XuiGetHzString(XuiImeAttr attr, char *outstr, int maxlen, unsigned int timeout);**	
Function	It is a Chinese input function with the associational function, and also can input English and numeric characters.	
Parameters	attr 【Input】	Attribute of the input method, see the structure **XuiImeAttr.**
	outstr 【Input】	Store the input string (ending with '_\0')
	maxlen 【Input】	The maximum length of the input string (the maximum permissible value is 1024 bytes)
	timeout 【Input】	Timeout value(0 means no timeout, 【unit:second】).

Return	0x00	Success
	0xFE	Illegal parameter value.
	0xFD	Timeout
Instruction	1. Press key 【 Alpha 】 to switch input methods (it can switch among“PinYin-Chinese”,“uppercase”,“lowercase”,“area code”) 2. In the method of area code input, users can input Chinese character according to the code. 3. Input Chinese. Press the corresponding numeric key in turn in the mode of PinYin-Chinese. For example, inputting the Chinese character“中”, users should input “1466” successively, then press 【**Enter**】and key 【1】 to select the“中”. 4. Input alphabet. Press letter in the mode of “Abc” inputting, and it will display on the screen, turn pages by pressing【Enter】, then select the target character. For example, if you press key【1】twice in succession, character “Q” will be inputted. 5. Input number. Press number in the mode of “123” inputting, then it will display on the screen. 6. Press key【Clear】to clear the inputted characters. 7. After inputting, press【Cancel】to exit the input method, and the inputted character can be obtained from the arguments OutStr.	
Note	Parameter description of input method in attr: 1. All of the pointers must be valid, such as font pointer, parent pointer and so on. 2. X and y cannot be negative. 3. Text_size must range from 12 to 40. (12 < Text_size < 40) 4. Height must be greater than 4*(text_size+10). 5. It does not support transparent in the background	

3.38 XuiGetString

Prototype	**int XuiGetString(XuiGetStrAttr attr,** **char *outstr,**

<table>
<tr><td></td><td colspan="2">unsigned char mode,
int minlen,
int maxlen);</td></tr>
<tr><td>Function</td><td colspan="2">Input the character string and it can display on the screen with the specified mode, and also can input letter, amount and password.</td></tr>
<tr><td rowspan="6">Parameters</td><td>attr 【Input】</td><td>Attribution, details see the structure XuiImeAttr.</td></tr>
<tr><td>outstr 【Input】</td><td>Store the input string (ending with ‘_\0’)</td></tr>
<tr><td>mode 【Input】</td><td>D7 1(0) reserved
D6 1(0) reserved
D5 1(0) whether input numbers
D4 1(0) whether input letters
D3 1(0) whether the ciphertext displays as ‘*’
D2 1(0) left(right)-aligned input
D1 1(0) whether has a decimal point
D0 1(0) reserved</td></tr>
<tr><td>Minlen 【Input】</td><td>The minimum length of the input string.</td></tr>
<tr><td>maxlen 【Input】</td><td>The maximum length of the input string (the maximum permissible value is 128 bytes)</td></tr>
<tr><td rowspan="3">Return</td><td></td><td></td></tr>
<tr><td>0x00</td><td>Normally complete the input</td></tr>
<tr><td>0xFE</td><td>Illegal parameter value (including the mode value is illegal; MaxLen =0; and the initial digital string is illegal.)</td></tr>
<tr><td></td><td>0xFD</td><td>Inputting timeout (120 seconds, and this value is invariant.)</td></tr>
<tr><td>Instruction</td><td colspan="2"></td></tr>
</table>

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4 Note

4.1 Multi-process Supports

Currently, the XUI does not support multi-process, because they will grab screen when running at the same time.

If requires to run multiple processes at the same time, users can implement it by the remote call. Using a main process to manage the screen, and create canvas for each process, switch screens of the multiple processes.

4.2 XuiDestroyWindow

Note that other resources used by the window should be destroyed after calling XuiDestroyWindow (). So destroy window firstly and then resource (such as image, font) followed.

Please abide to this principle: First create last destroyed, last create first destroyed.

For example:

The right way to destroy:

```
//create
font_simsun_0 = XuiCreateFont ("./res/fallback.ttf", 0, 0);
img_bg = XuiImgLoadFormFile ("./res/bg.png");
btn = XuiCreateButton(XuiRootCanvas(), 10, 50, 220, 30);
```

```
//destroy
XuiDestroyWindow(btn);
XuiImgFree(img_bg);
XuiDestroyFont(font_simsun_0);
```

The wrong way to destroy:

```
//create
font_simsun_0 = XuiCreateFont ("./res/fallback.ttf", 0, 0);
img_bg = XuiImgLoadFormFile ("./res/bg.png");
btn = XuiCreateButton(XuiRootCanvas(), 10, 50, 220, 30);
//destroy
XuiImgFree(img_bg);
XuiDestroyFont(font_simsun_0);
XuiDestroyWindow(btn);
```

5 FAQ

1. The root canvas exists after open the XUI, so can we directly call the function to get the root canvas? Does the root canvas can be destroyed?

Answer: Users can call XuiRootCanvas () to get the root canvas, but cannot be destroyed. In additional, if the XUIOpen () has set the status bar, the status bar canvas exists after calling the XUIOpen (), users can directly operate the status bar by XuiStatusbarCanvas (), and the canvas cannot be destroyed.

2. Does it support canvas nesting? For example, Root canvas-> sub-canvas 1 -> sub-canvas 2-> sub-canvas 3-> ... -> sub-canvas N? Is there a limit to N?

Answer: Yes, it supports nesting, and even has no any limitation, but users need to manage XuiWondow pointer of each canvas. Follow the principle to destroy windows: First create last destroyed, last create first destroyed.

3. Does the canvas support using the ShowWindow to display?

Answer: Yes.

4. Does it need to call DestoryWindow () to release the signature boar?

Answer: Yes, the types which return XuiWindow* need to be destroyed, but except XuiRootCanvas () and XuiStatusbarCanvas (), since they will be destroyed automatically.

5. When displaying images, how to adjust the image size? Stretch or fill?

Answer: Do not stretch. If the image size is larger than the display area, it only displays the part which is in the area. If the image size is smaller than the display area, the blank space fills the background color.

6. When call ClearArea (), does it clear contents in the upmost layer or all contents of the multiple layers? Or just using the background color to cover this area?

Answer: It depends on the arguments XuiWindow *window, you can set the canvas pointer of the layer which you want to clear, and it will display the canvas background.

XUI Programming Guide

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