Based on TINY4412 development board Gobang game and Equipment Management System Procedure manual

v1.8

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CONTENTS

1. the product description

This system is a gobang game and realize the basic equipment of Tiny4412 development board of management and drive systems,.

The system includes two modules: gobang game module and device management module;

Gobang module includes some functions as start the game, undo, change the background, restart and exit the function.

Device management module includes equipments such as PWM, ADC, LCD, LED, CTPM, WDT, RTC, KEY, I2C etc.

2. The auther information

Development Team	Songze Li, ChenNing, Shuchao Wang, MaRui
Soft development	Songze Li, ChenNing, Shuchao Wang, MaRui
Picture processing	Songze Li
Document writer	Marui
Development Tools	VIM ,arm-linux-gcc
Development Platform	Tiny 4412 development board Red hat 6.4

3. the software catalog

Project/

+init/

+drv/

+tool/

sd_fusing.sh

Makefile

bl1.bin

bl2.bin

image

pics

init / is all the boot program, after the power is on, this boot program will be loader to development board; And all of driver program will be load to emmc also;

drv/ in the main driver code, includes all the equipments driver, such as: pwd lcd led rtc adc ctpm key wdt etc.

Tool/ is used for create bl2 images.

image is an electronic photo album, mm storage menu Photo.

Pics is some electronic pictures about this system background.

Note: If you are not in these photographs goddess, modify mm file.

4. the programming method

4.1. Usage:

If you want use this system. First ,pleasse into the root directory of this project, execute make command, and then insert the SD card, execute the command "./sd_fusing.sh+/dev/ under SD device number" and then insert SD card into development board ,watch the screen waiting to print information.

After successful screen printing：

BL1 fusing

BL2 fusing

---

mydriver fusing

---

my images fusing

---

my pics fusing

---

my driver is fused successfully.

Eject SD card and insert it again.

5. Boot information

5.1 Overview.

Use white on black 12X22 character interface development board power connector.

When you turn on the power development board, you can see the Welcome screen, which will show during the three welcome statement, while there will be a progress bar to prompt the device initialization progress.

After the initialization is complete the system will enter the menu interface, in addition to the system also provides a way to use the serial port of the distal end of the control, such as to enter the serial control mode, repeatedly using five fingers start interface initialization time while you click the screen, you can abandon into the graphics window to enter the command and control mode, which will be displayed on the screen when a shell window.

5.2 The principle.

1. 12x22 achieve white on black.

The 12X22 font advance ready (font_12x22.h).To show the principle of the LCD control font characters on the monitor display. Binary coded character array of characters corresponding to the position is set to white, and the reference position laterally offset 12 pixels.

2. Hardware initialization reminder

By implementing formatted output functions (uprintf) achieve full statement is displayed on the LCD screen. Then, after each hardware initialization is complete, the formatted output completion status.

3. With regard to the timer function.

SOC provides the RTC, the RTC can be set and get real-time clock system, while taking advantage of RTC can also generate some timer interrupt.

SOC provides five dedicated timer (except WDT), use one interrupt generation timing. Here we use a timer 4 detects a touch operation, use the interrupt handler to realize the screen click detection.

In addition the system uses the WDT watchdog timer to program timing,

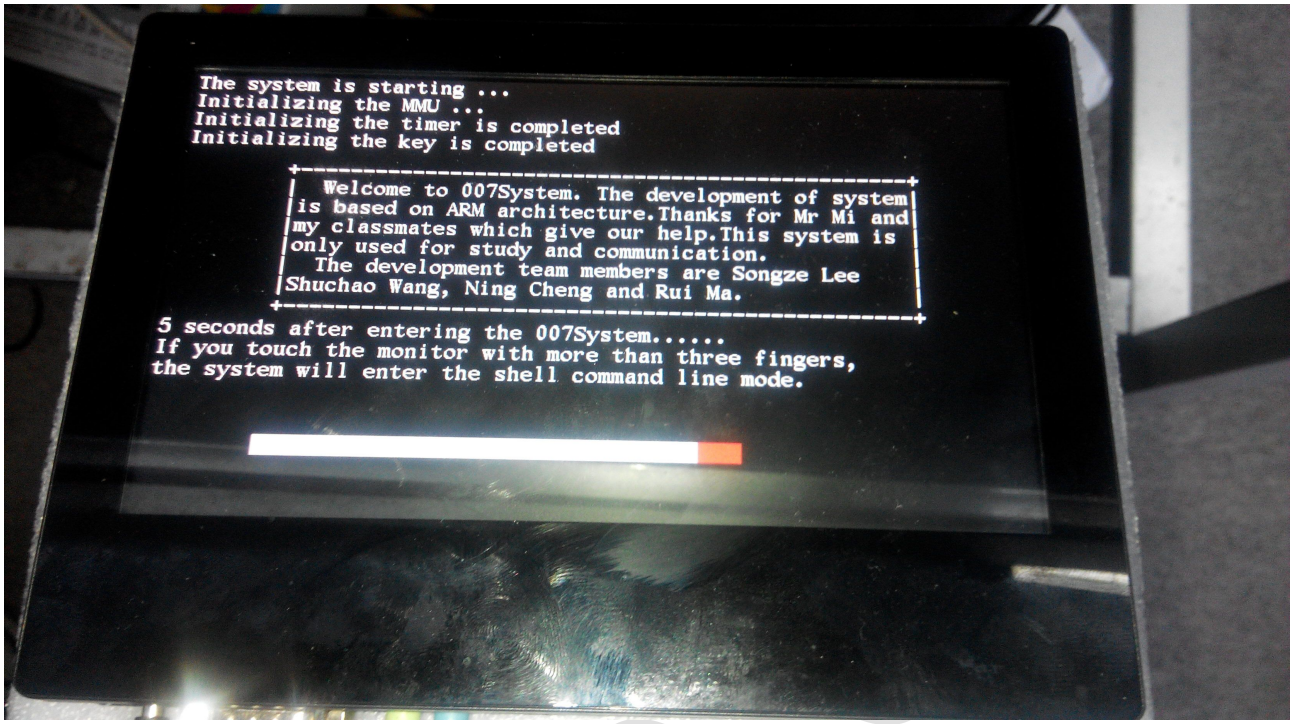
4. Interrupt control flow

Most places use the program interrupt manner responses to a variety of devices, such as response buttons, touch screen response. By the time the various functions initialize various interrupt register, when an interrupt occurs, the interrupt handler execution, responds to the various functions.

5. With regard to multi-window problem

Used in the system in a multi-window backgammon game technology, show different content on different windows, win0 display background images, board and pieces are displayed in the upper win1 by setting win1 to achieve two key colors windows displayed simultaneously.

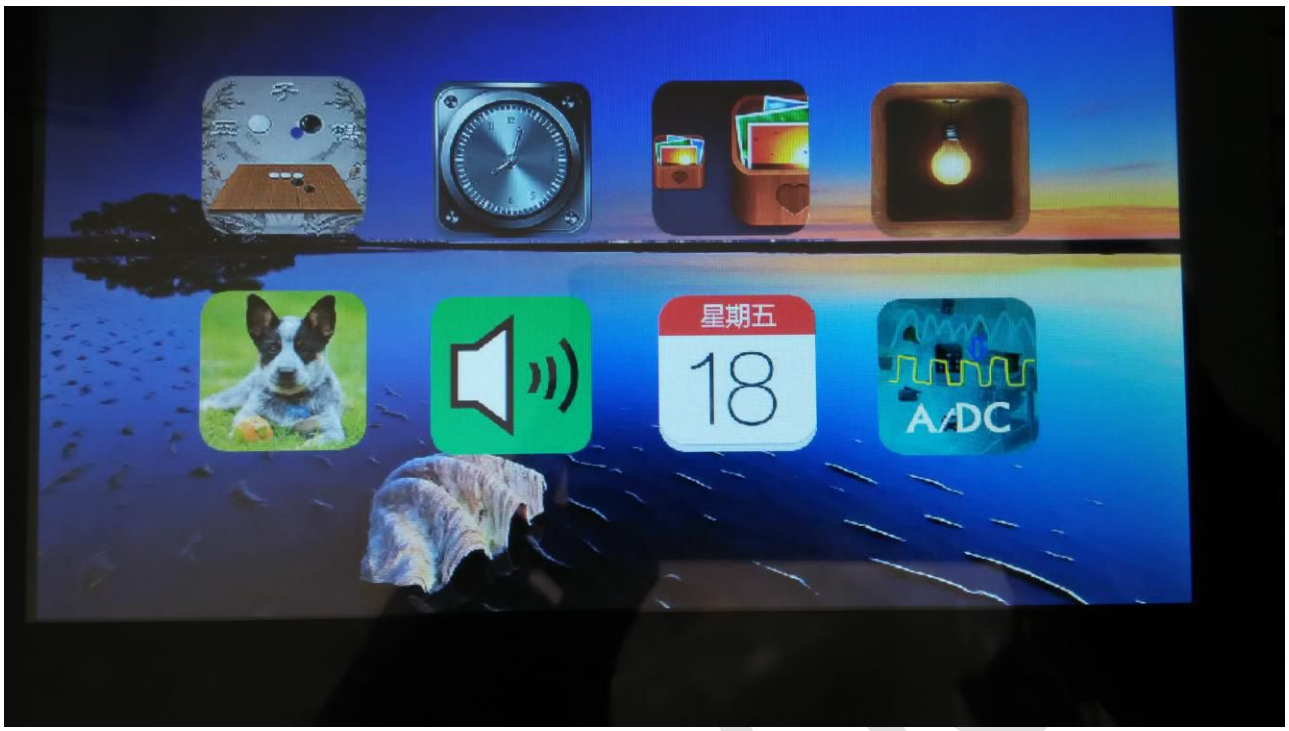
5.3 boot interface in SD



Boot interface in uart control

5.4 Menu interface

The following graph shows the main menu for the GUI

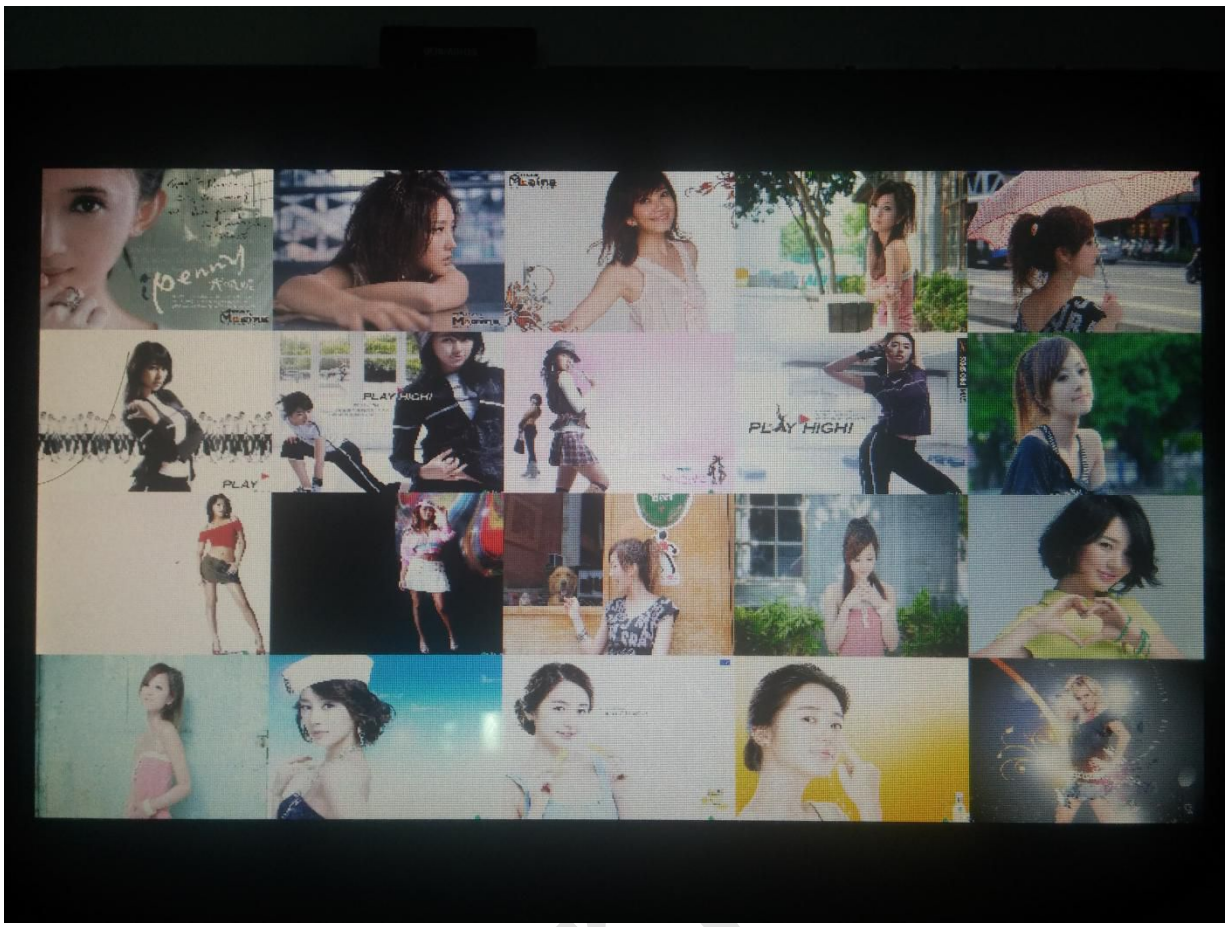


6.Function module

6.1 Equipment management module

6.1.1 gallery function

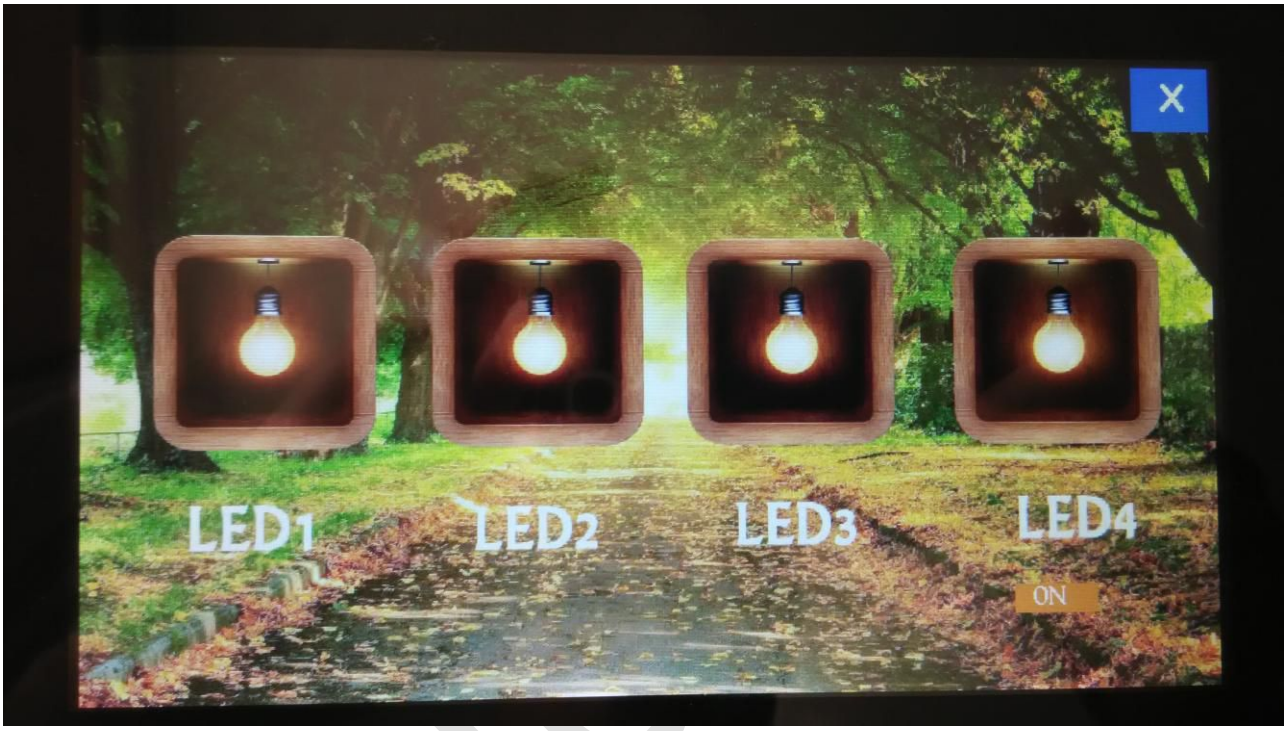
Enter the electronic album interface, you can see a 5x4 photo thumbnails, click on any picture will enlarge this photo.



Click on the photo bottom left, after the switch before a photo, click on the photo bottom right corner, switching a photo, click on any photo top right corner to return to the main menu.

6.1.2 Led function

Regional Representative corresponding led lights click on the screen, the corresponding led light, click again, the corresponding LED lights out.

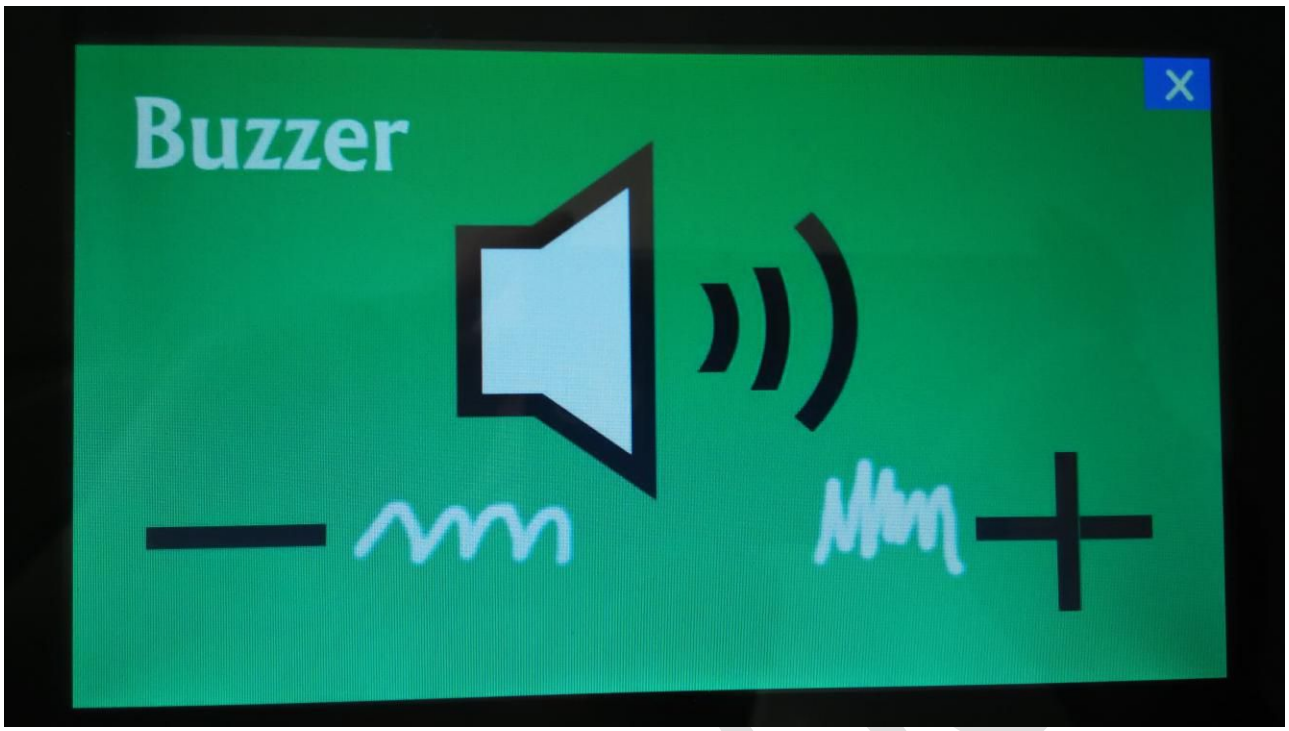


6.1.3 Buzzer function

Enter BUZZER graphical interface, you can press the corresponding icon graphical interface to open and close the buzzer

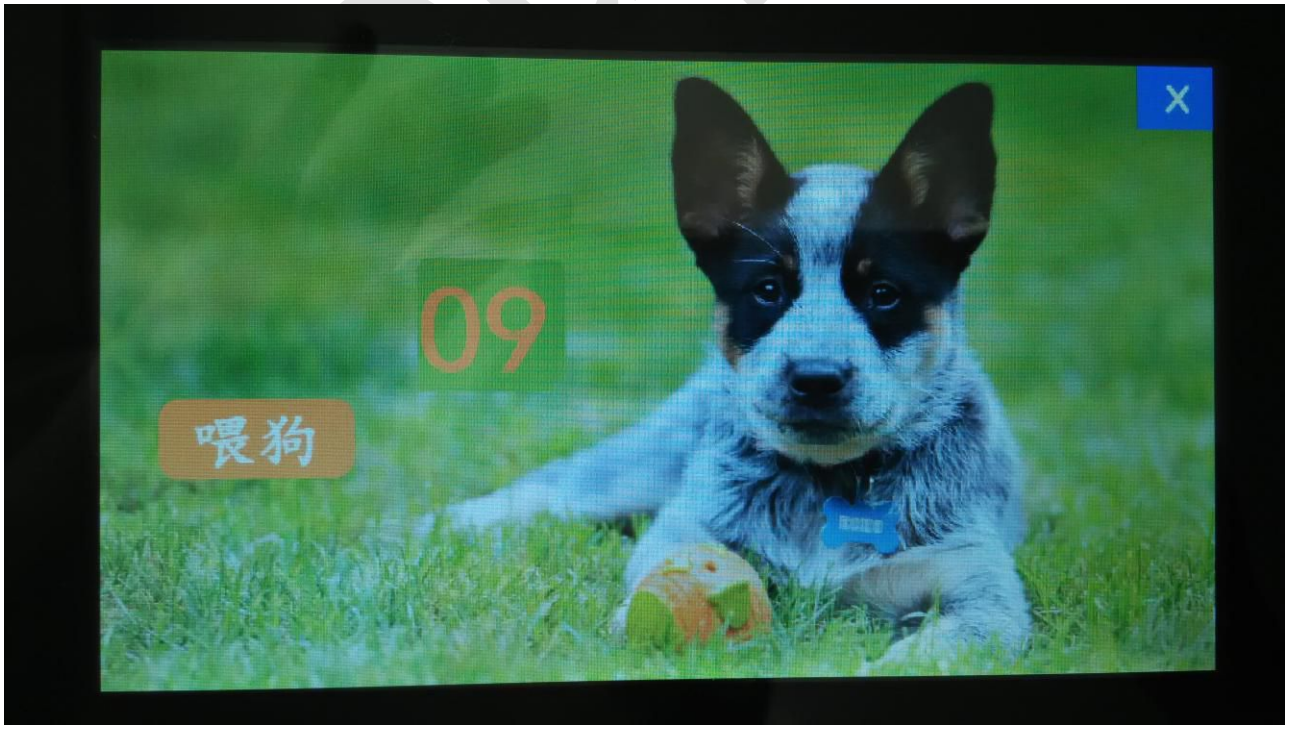
Click on X (upper right corner) Release BUZZER screen and return to the main menu

After entering the PWM interface, PWM graphical interface by entering "+" "-" to adjust the frequency speed point X (upper right corner) Release PWM interface and return to the main



6.1.4 watchdog function

After entering wdt interface, the system will automatically countdown 15s, after the end of the countdown, the system will automatically restart if the timer expires before clicking puppy, then again from the 15s began the countdown, when clicked, from the top to close the menu button, the system automatically re-start close.

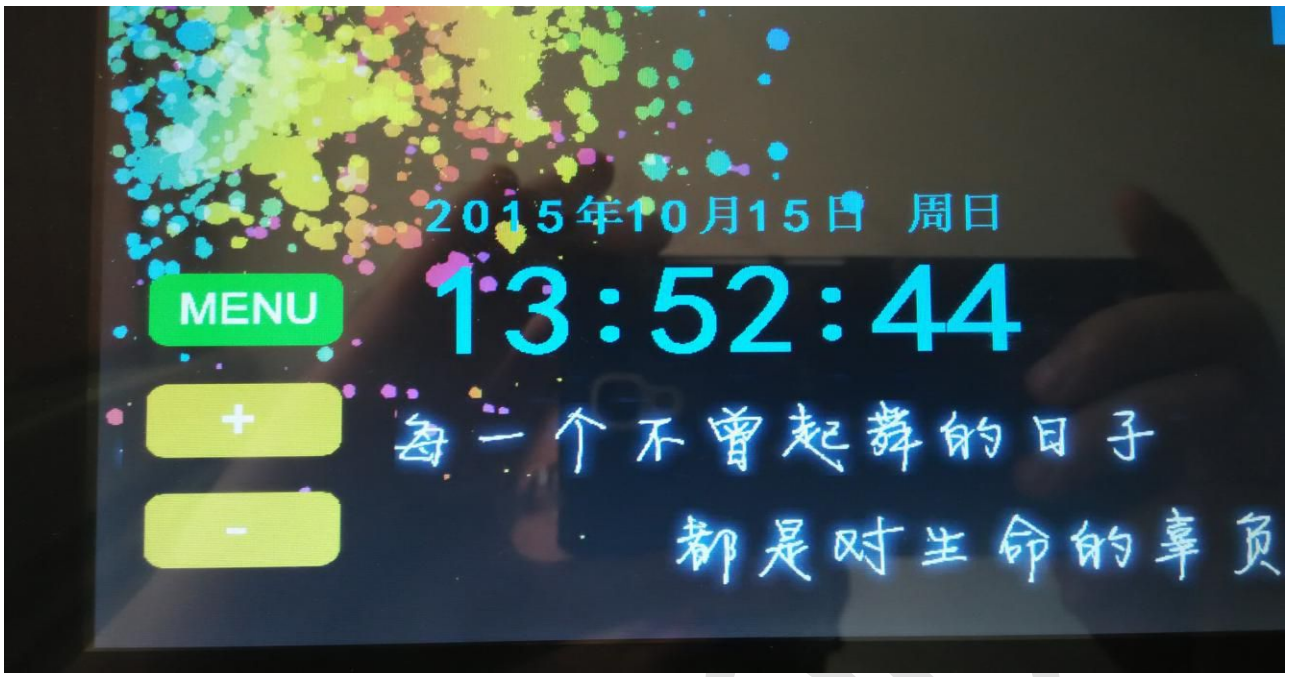


6.1.5 ADC function

Go to ADC graphical interface you can see the data, click on any key (key1-key4) to close the ADC, click on X (upper right corner) Release ADC interface and return to the main menu

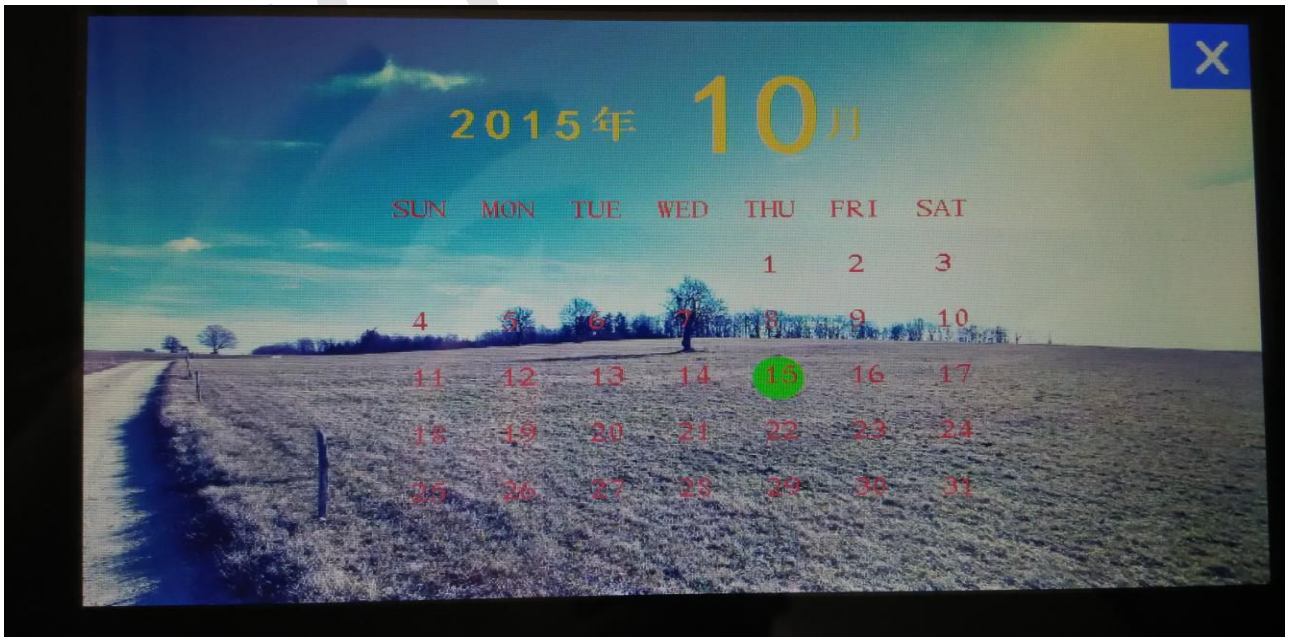
6.1.6 clock function

By graphical interface, set the "Set Alarm" "adjustment time" two touch buttons. When you press the "Set Alarm" or "adjustment time" button, the currently displayed time stops, enter the adjustment mode. In the adjustment mode, hor +, hur-, min +, min-, sec +, sec-, OK 7 function keys will take effect. When touched once every hour, minutes, seconds on part of the region corresponding to the corresponding time will increase 1; similarly, whenever touch once, minutes, seconds, corresponding to the lower part of the region, the corresponding time will be reduced by one. Press "OK" key (screen right), you will save the settings and exit the adjustment mode. When the alarm sounds, press the screen left of the yellow watches look like buttons, turn off the alarm.



6.1.7 calendar function

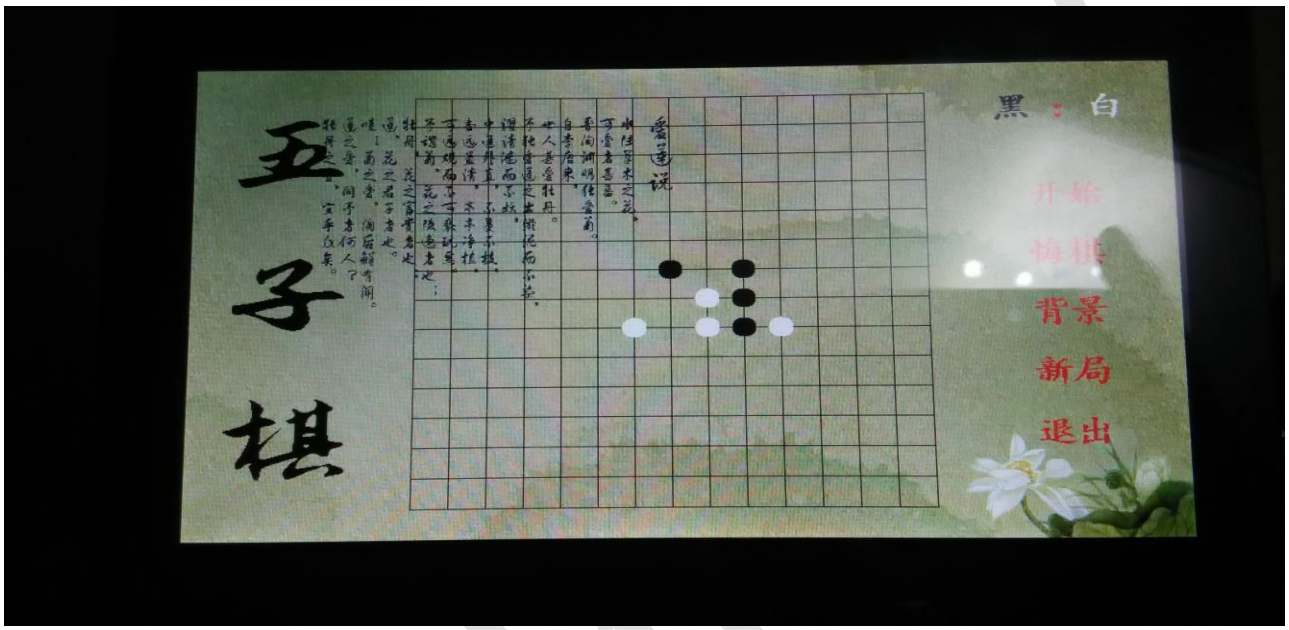
Click on a region corresponding to the calendar menu interface, enter calendar interface, read the current time as the default calendar for the current calendar time, when entering the default display the current month calendar, and highlight the day, paddling on behalf of a single finger to the left to view the previous calendar month , slide your finger to the right on behalf of a single month calendar view.



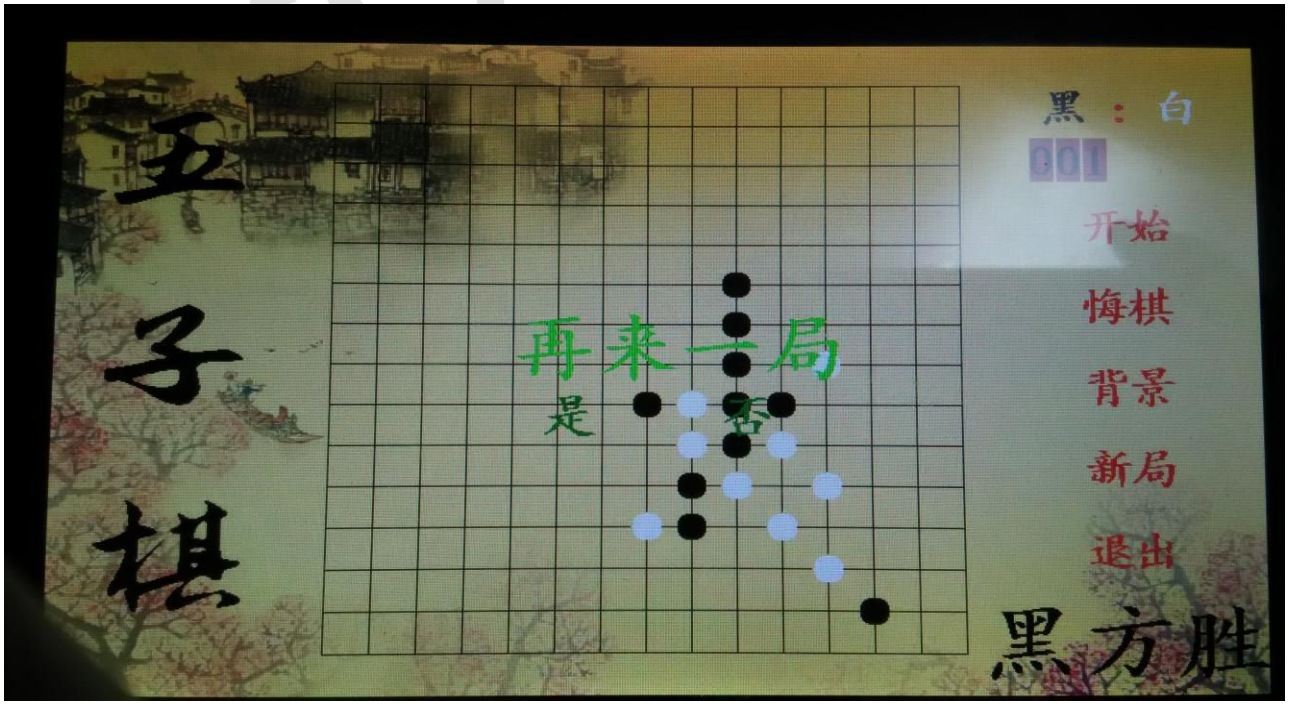
6.2 gobang game module

6.2.1 Normal game

Click Start, the system randomly assigned to just get one color, one son, alternately, until a party the first to reach five of the same color pieces connected together, the first to reach the victory, when there is one winner, the system asks you to continue, the choice is then save winner scores every inning victory one point, if continued fraction is empty



When one side have win will ask



6.2.2 Undo mode

When the wrong one piece, after the consent of the opponent's consent, can step back and back, the system defaults for each step back, rather than two steps back, therefore be subject to mutual agreement good game.

6.2.3 change background

If you do not like the default background of the game, then you can click on the Background button to switch the background image.

6.2.4 Exit from game

If you do not want play continue, you can chose to press the exit buttom,then you will back to menu interface.

7. zoning system

SDRAM division:

The command line displays the address: 0x40008000 ~ 0x40009e00

Menu Picture Show Address: 0x62000000

Photo thumbnail display address: 0x52000000 ~ 0x62000000

Electronic photo display address: 0x52000000 ~ 0x62000000

EMMC division:

The main program starting block: 49

The main program starting block size: 656

Electronic photo starting block: 705

Electronic photographs block size: 40960

Main Menu Pictures starting block: 42000\

8.architecture design

Program is divided into two sections / project / init and / project / os

/ project / init /:

start.S

1. initialize stack

2 Initialize the clock

3 Initialize memory

app.c

1. initialize the serial port, copy the program into memory, and turned around

/ project / os /:

app.c

1. copies of electronic photo album to a specified memory address

2. Copy the GUI menu image to the specified memory address

menu.c

3. each hardware initialization and boot print information

4. Select the boot mode, within five seconds, press any key to the command line, or enter the test mode GUI, command line mode execution shell_menu (), GUI interface will perform shell_gui ().

9. Conclusion

The preparation of this manual is designed to fully describes the function and use of the software can be achieved, so that users understand the software and provide the necessary information for the software maintenance and updates.