

The MMI design based on the Nucleus System

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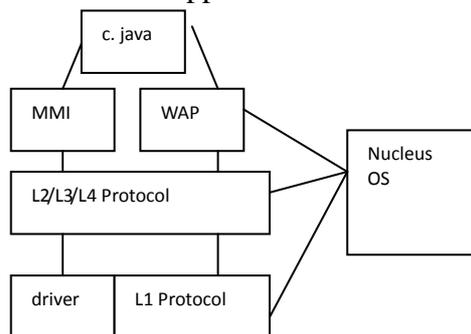
Abstract. With the rapid development of computer science and technology, embedded system as a new area of computer application, with its simple, efficient and so more and more people pay attention, Nucleus as a typical embedded operating system, with small, powerful, easy to customize and other characteristics, is one of the most popular embedded operating systems, this paper based on the design of this system, MMI, improves the performance of the terminal in the test.

I. INTRODUCTION

With the wide application of embedded systems, the demand for human-machine interface (MMI) more and more obvious, users are increasingly concerned about product features simple operation, simple and friendly interface. Nucleus has a real strong, characteristic style and preemptive multitasking; Nucleus addition to providing powerful core operating system, but also provides real-time graphics applications support Windows module, a graphical user interface. Users can choose according to their application to different application modules. MMI is the interaction between people and mobile communications to provide mobile communication service phone's interface. It includes hardware and software: hardware keyboard, display and SIM cards; basic HMI software, users SIM card function, multi-class menu display and phone book function.

II. MTK SOFTWARE PLATFORM

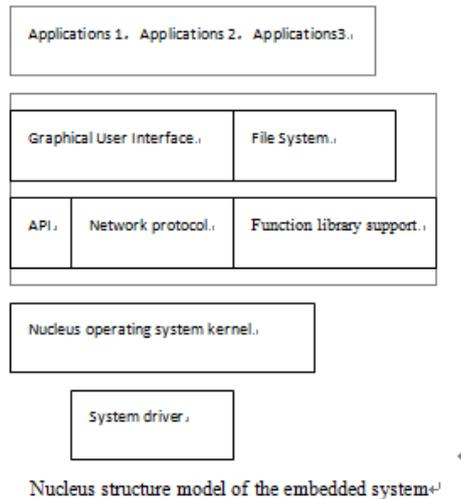
MTK software architecture with the layer concept, it will each function module is divided into different layers, each layer to achieve their respective features. The whole software framework is mainly composed of Remote MMI, MMI, L4, Drivers and PS/L1 several parts. Remote MMI namely RMI, such as PC, can use AT commands via a serial port and communication protocol stack; Between L4 of MMI/ats and protocol stack adapter layer; Drivers include various drive equipment and peripheral equipment; L1 of PS/L1 (Layer1) to the bottom of protocol stack, it is the GSM, the physical processing signal data directly; In addition, the inside of the protocol stack L2 and L3 contains a large number of GSM/GPRS requirements, and provide a good platform for the GGSM/GPRS to the application. as shown in Figure:



General structure of MTK software solutions

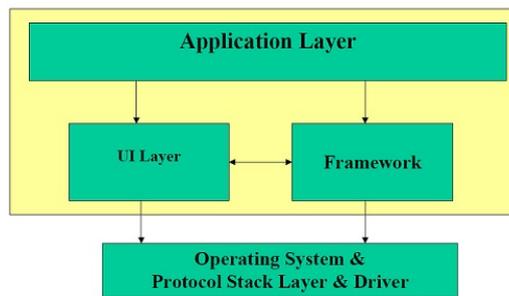
III. THE NUCLEUS SYSTEM OVERALL STRUCTURE

Nucleus embedded systems have a wealth of functional modules, as shown in Figure:



A. MMI architecture

MMI stands for Man Machine Interface, is, human-machine interface or HMI. HMI into text interface (such as DOS) and the graphical interface (such as Windows) Two types, MMI is mainly composed of Application Layer, Framework and UI Layer of three parts. the platform belonging to a simple graphical interface. MMI platform architecture diagram is shown below:



Picture 1

The top of the application layer is using and the function of the underlying service, designed for users of various application, has the interface between each layer, convenient for data transmission.

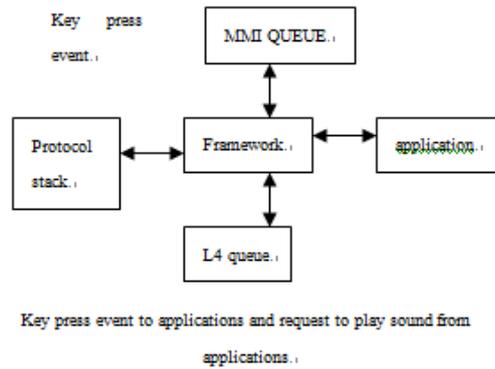
The Framework layer: contains wrapper for managing messaging and event handing facilitate the application flow provides os abstraction portability contains wrapper for managing ui related functions.

We need to do is usually the most upper Application Layer development, to the next Layer is the graphic platform subsystem, graphics subsystem generally provided by the system provider, go back to the next Layer is the hardware driver.

B. Task Structure

MMI is a task, the tasks include the most important is initialization. Such as: hardware boot and setup system stack, nucleus plus initialization, hardware initialization, tasks modules initialization configuration, tasks creation, etc.

MMI task routines includes: mmi task routines; waits for messages sent to the mmi queue; messages in this queue are put by the protocol stack; framework layer processor the events; framework layer triggers callbacks to the application layer; application layer uses ui layer category functions and themes for screen display.



The application makes call to request framework layer for passing a message to L4 queue. Framework writes message to the L4 queue, the L4 task reads event from the L4 queue and plays requested sound.

IV. INITIALIZATION

When app is initialized, it will open the boot window will call mainapp.c interface, open the standby window.

```

PUBLIC void MAIN_OpenIdleWin(void)
{
    if(!MMK_IsOpenWin(MAIN_IDLE_WIN_ID))
    {
        MMI_WINDOW_CREATE_T win_create = {0};
        win_create.applet_handle = MMK_GetFirstAppleHandle();
        win_create.win_id = MAIN_IDLE_WIN_ID;
        win_create.func = IdleWin_HandleMsg;
        win_create.win_priority = WIN_LOWEST_LEVEL;
        win_create.softicon_state = 0x127E;
        win_create.window_style = WS_HAS_ANLM_BG;
        MMK_CreateWindow(&win_create);
    }
}

```

Actual standby window as shown below



The actual standby window

IV. CONCLUSION

the MMI design based on the Nucleus system, it can be seen that the optimization of MMI interface, the user more flexible safety operating functions, a more humane, the terminal allows the capacity of the user can freely within the scope of operation, and there will not be jammed pause status, but also to a certain extent, improve the mobile speed, reduce the waiting time of user do this.

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