cirkisys

a member of the VTECH group

CIRKISYS ELECTRONICS LTD.

Technical Description of the VTECH Email Express Unit

1. Introduction

This device is an E-mail Express Unit with the following features:

a. Send & receive proprietary format email through service provider by telephone line.
b. Receive paging messages and proprietary format email messages through air.
c. One touch button of send & receive mail.
d. Operated by 2xAA batteries.
e. 240x50 dot B/W LCD display.
f. Function hot keys.
g. Full size QWERTY keyboard.
h. Software Feature:
   - Send & receive email.
   - Games
   - Organizer & scheduler
   - Calculator
   - Clock

2. Hardware Description

The hardware of the Email Express Unit can be simply described by the block diagram which is shown in Figure 2.1. Each block would be further explained in the following sections.

2.1 The Main Controller

The main controller of this device is the NSC1028 Compact RISC Processor. It is a 16bit micro-controller with 2.5kbytes RAM and 10kbytes ROM. There is also an internal PLL to generate 35MHz clock frequency from a 32KHz clock source. It controls every peripheral module on the board. That includes the LCD module, keyboard, modem module, pager module, the memory module and the power module.

2.2 The LCD module

This is a 240x50 dots graphic type LCD. There are totally 240segment lines and 50 common lines. Therefore, 2 LCD segment driver and 1 LCD common driver is used. The LCD module would be turn off by the main controller for power saving.

2.3 Keyboard

This is a 60keys keyboard and is created by a 12x8 matrix. The keyboard is activated by interrupt and hence reducing the scanning interference.

2.4 Modem Module

The modem module includes a modem chip which has a maximum of 2400bps transmission rate. Also, the telephone line interface circuit is equipped. This module is built in a separated PCB and it is connected to the email main PCB by a 10pin header.

2.5 Pager Module

This is a FLEX Protocol Paging Module and is in compilation with Motorola FLEX™ G.1.8 standard. It supports 8bit transmission code, 1600/3200/6400kbps transmission rate and up to 16 paging addresses. Ir is mainly divided into two sections – Digital section and RF section. The RF section corresponds to receive and demodulate the 931.9375MHz channel data from air. The digital section would then analyze the data, pack them properly and store/send the messages to the host system. The RF demodulation process is based on conventional double conversion superheterodyne method. The first and second stage IF frequencies are selected to be 21.4MHz and 455KHz respectively. The first IF conversion is achieved by mixing the 931.9375MHz input signal with the 910.5375MHz local oscillator output. The second stage IF conversion as well as FSK demodulation (2/4 levels) are done by the FM-IF IC. This FM-IF IC would also provide +1.0V regulated supply to other discrete components on the RF section. The demodulated message data is first passed to the FLEX decoder which is located in the digital section. The FLEX decoder wakes up at the preset frame slot and looks for data. If data is ready, it would send request to the MCU and wait for data transfer. The MCU would then check and pack the data and store it to the SRAM. If host system is in active mode, the MCU would request to send host the message. If not, the message would be accumulated in the SRAM until reaching 70% memory capacity. This approach is to reduce

unnecessary wake-up power consumption. All the pager settings including user capcodes, bit rates and other FLEX decoder configuration are stored in EEPROM.

2.6 Memory Module

There are two memory chips in the memory module. One is a 32kbyte SRAM which acts as a data buffer. Another one is a 1Mbyte flash RAM. The upper 128Kbytes memory is reserved for the program code and the lower 896Kbytes memory is reserved for file system.

2.7 Power Module

The input of the power module is two AA size battery cells, i.e. 3V. The 3V input would then be stepped-up to 3.3V and 5V respectively by two DC-DC converter.