



杭州电子科技大学
HANGZHOU DIANZI UNIVERSITY

《单片机原理及应用》作业报告

实验报告 2 第一部分：数据迁移

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1 原题目

将片外数据存储器地址为 1000H 1030H 的数据块，全部迁移到片内数据存储器 30H 60H 中，并将原数据块区域全部清零。用 C 语言编程。

2 实验程序

Code Listing 1: 数据迁移实验程序

```
1  #include <reg51.h>
2
3  #define EXTERNAL_START  0x1000
4  #define INTERNAL_START  0x30
5  #define DATA_LENGTH    49  // 从 0x1000 到 0x1030，共 49 字节
6
7  void main() {
8      unsigned char i;
9
10     // 1. 初始化片外RAM：写入测试数据
11     for (i = 0; i < DATA_LENGTH; i++) {
12         *((unsigned char xdata *) (EXTERNAL_START + i)) = i+1; // 存入递增的值
13     }
14
15     // 2. 从片外RAM读取，写入片内RAM
16     for (i = 0; i < DATA_LENGTH; i++) {
17         *((unsigned char idata *) (INTERNAL_START + i)) = *((unsigned char
18             xdata *) (EXTERNAL_START + i));
19     }
20
21     // 3. 清零片外RAM
22     for (i = 0; i < DATA_LENGTH; i++) {
23         *((unsigned char xdata *) (EXTERNAL_START + i)) = 0x00;
24     }
25
26     while (1); // 停止程序运行，便于调试观察
27 }
```

3 实验效果


Address:	x:0x1000																															
X:0x001000:	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15	16	17	18	19							
X:0x001019:	1A	1B	1C	1D	1E	1F	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F	30	31	00							
X:0x001032:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00							
X:0x00104B:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00							
X:0x001064:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00							
X:0x00107D:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00							
X:0x001096:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00							

图 1 片外存储器赋值后，内存存储（执行完前 13 行）

Address:	I:0x30	
I:0x30:	00 00	
I:0x4A:	00 00	
I:0x64:	00 00	
I:0x7E:	00 00	
I:0x98:	00 00	
I:0xB2:	00 00	
I:0xCC:	00 00	

图 2 片内存储器赋值前（执行完前 13 行）

Memory 1	
Address:	<input type="text" value="x:0x1000"/>
X:0x001000:	00 00
X:0x001019:	00 00
X:0x001032:	00 00
X:0x00104B:	00 00
X:0x001064:	00 00
X:0x00107D:	00 00
X:0x001096:	00 00

图 3 程序执行完，片外存储器指定区域清零

Memory 2																																
Address:		I:0x30																														
I:0x30:	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15	16	17	18	19	1A						
I:0x4A:	1B	1C	1D	1E	1F	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F	30	31	00	00	00	00	00	00	00	00	
I:0x64:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		
I:0x7E:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		
I:0x98:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		
I:0xB2:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		
I:0xCC:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		
I:0xE6:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		

图 4 程序执行完，片内存储器赋值情况

4 流程图

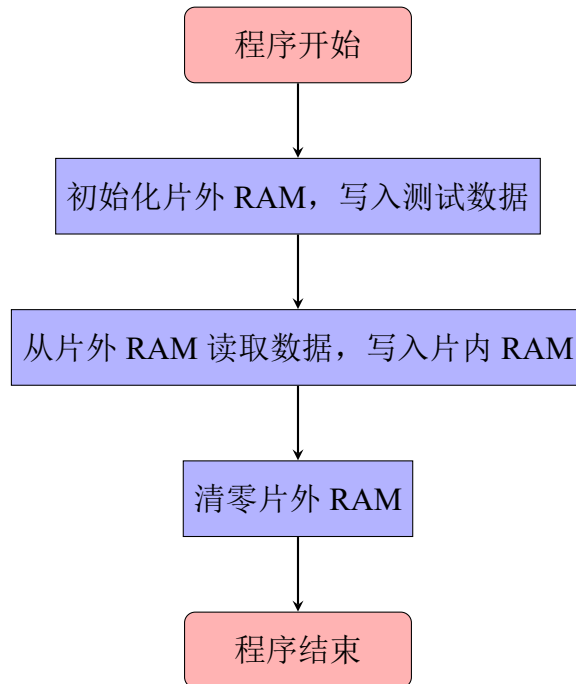


图 5 数据迁移程序流程图

5 实验体会

实验通过实现片外数据存储器到片内数据存储器的数据迁移，巩固了对单片机存储器操作的理解。通过编写 C 语言程序，熟悉了 `xdata` 和 `idata` 的使用，初步掌握了片外和片内存储器的地址映射及数据操作方法。此外，通过清零片外存储器的操作，理解了数据清理的重要性。实验还通过观察内存变化验证程序的正确性。总之加深了 C51 程序的熟练程度。