

SIOC嵌入式軟體實驗

實驗四：Embedded SRAM



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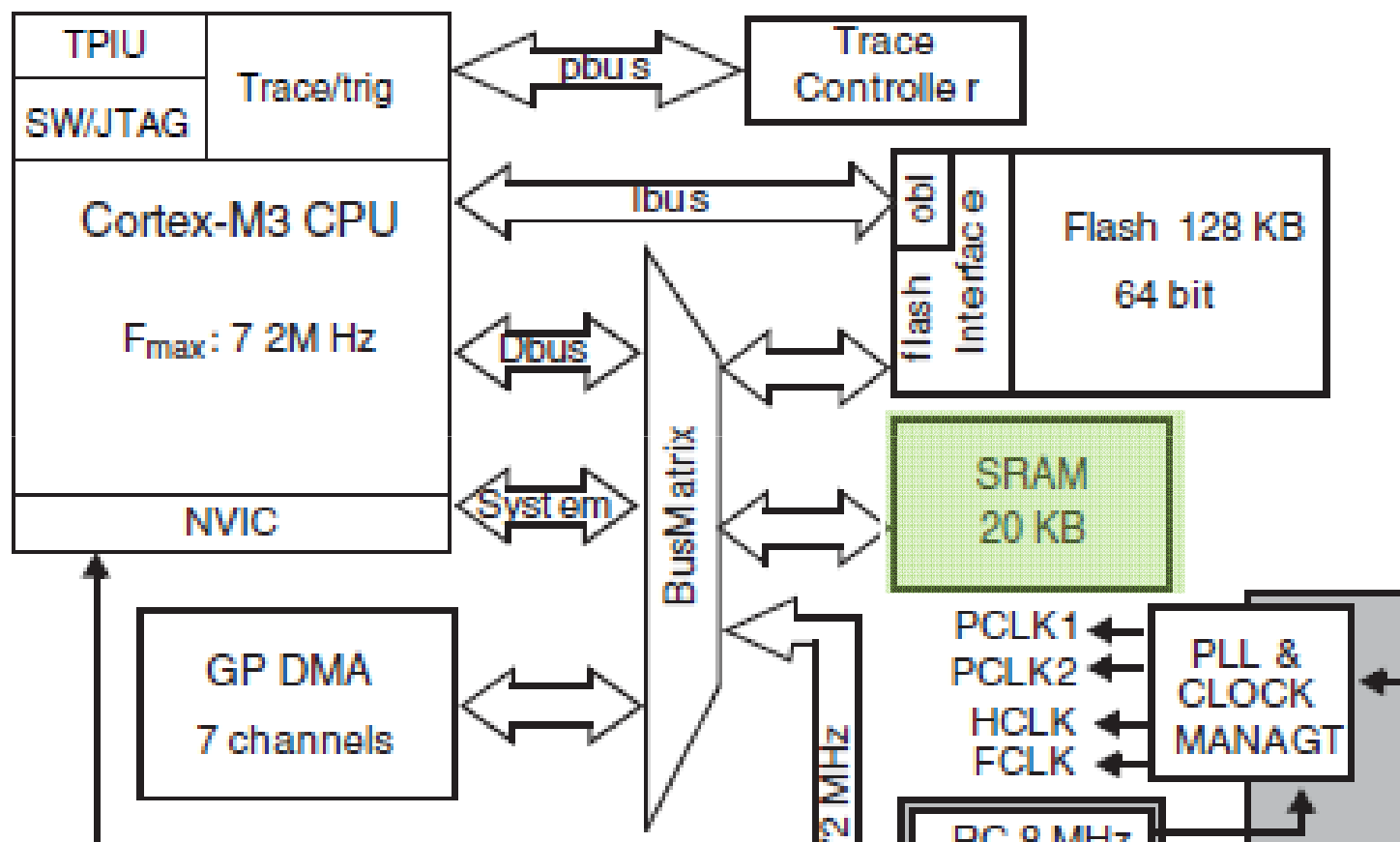


實驗目的

□瞭解ARM Cortex-M3與SRAM連接的架構，
實驗存取SRAM，並透過VCP傳送到超級終端機
顯示結果



系統架構圖



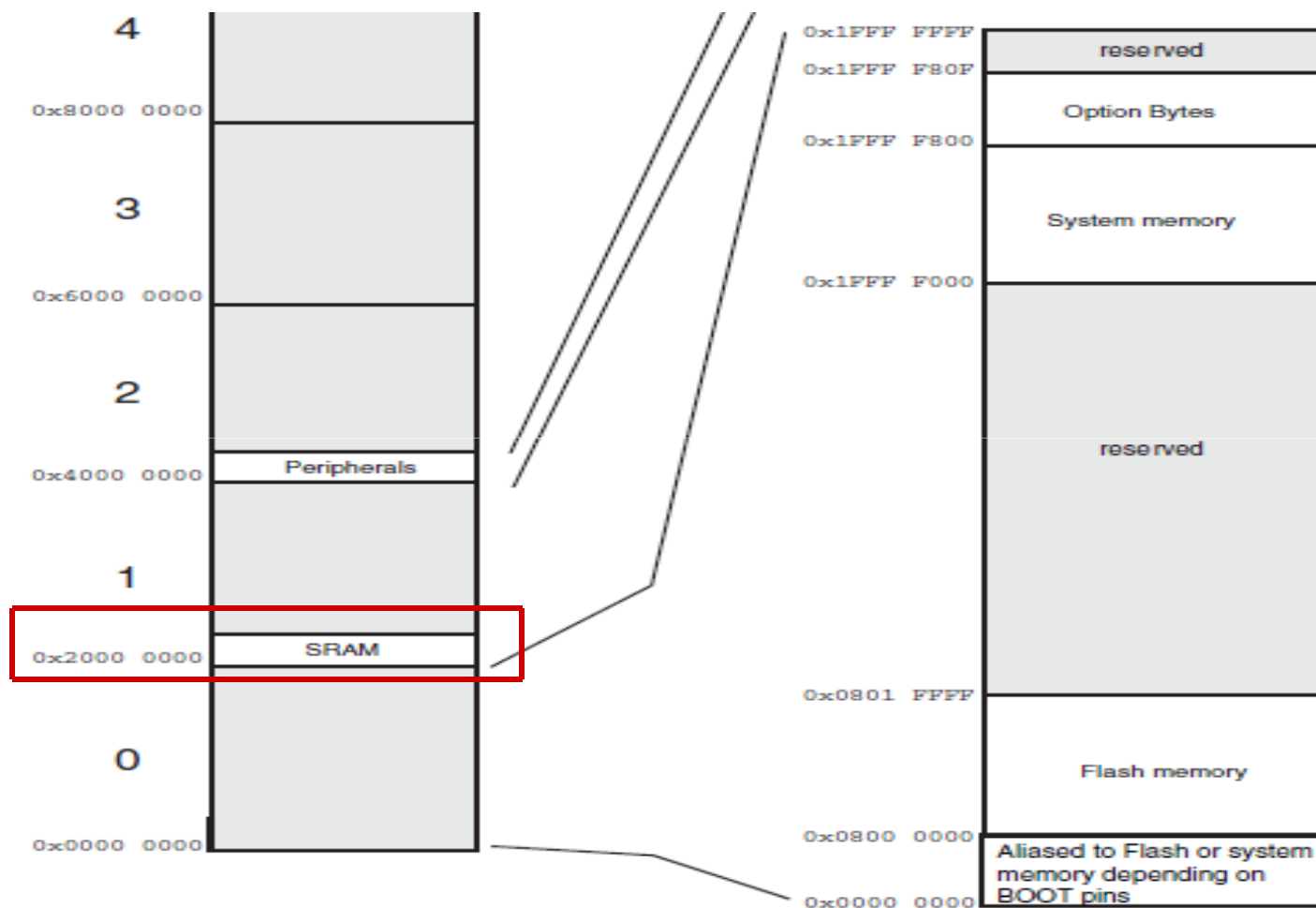


Embedded SRAM

- ❑ 20KBytes of embedded SRAM
- ❑ accessed (read/write) at CPU clock speed with 0 wait states



Memory Mapping





Keil環境設定

Options for Target 'MIAT_STM32'

Device Target Output Listing User C/C++ Asm Linker Debug Utilities

STMicroelectronics STM32F103C8

Xtal (MHz): 8.0

Operating system: None

Code Generation

- ☐ Use Cross-Module Optimization
- ☒ Use MicroLIB ☐ Big Endian
- ☐ Use Link-Time Code Generation

Read/Only Memory Areas

| | default | off-chip | Start | Size | Startup |
|-------------------------------------|---------|----------|-----------|---------|----------------------------------|
| <input type="checkbox"/> | | ROM1: | | | <input type="radio"/> |
| <input type="checkbox"/> | | ROM2: | | | <input type="radio"/> |
| <input type="checkbox"/> | | ROM3: | | | <input type="radio"/> |
| | | on-chip | | | |
| <input checked="" type="checkbox"/> | | IROM1: | 0x8003000 | 0x10000 | <input checked="" type="radio"/> |
| <input type="checkbox"/> | | IROM2: | | | <input type="radio"/> |

Read/Write Memory Areas

| | default | off-chip | Start | Size | NoInit |
|-------------------------------------|---------|----------|------------|--------|--------------------------|
| <input type="checkbox"/> | | RAM1: | | | <input type="checkbox"/> |
| <input type="checkbox"/> | | RAM2: | | | <input type="checkbox"/> |
| <input type="checkbox"/> | | RAM3: | | | <input type="checkbox"/> |
| | | on-chip | | | |
| <input checked="" type="checkbox"/> | | IRAM1: | 0x20000000 | 0x5000 | <input type="checkbox"/> |
| <input type="checkbox"/> | | IRAM2: | | | <input type="checkbox"/> |

OK Cancel Defaults Help

實驗：SRAM資料存取

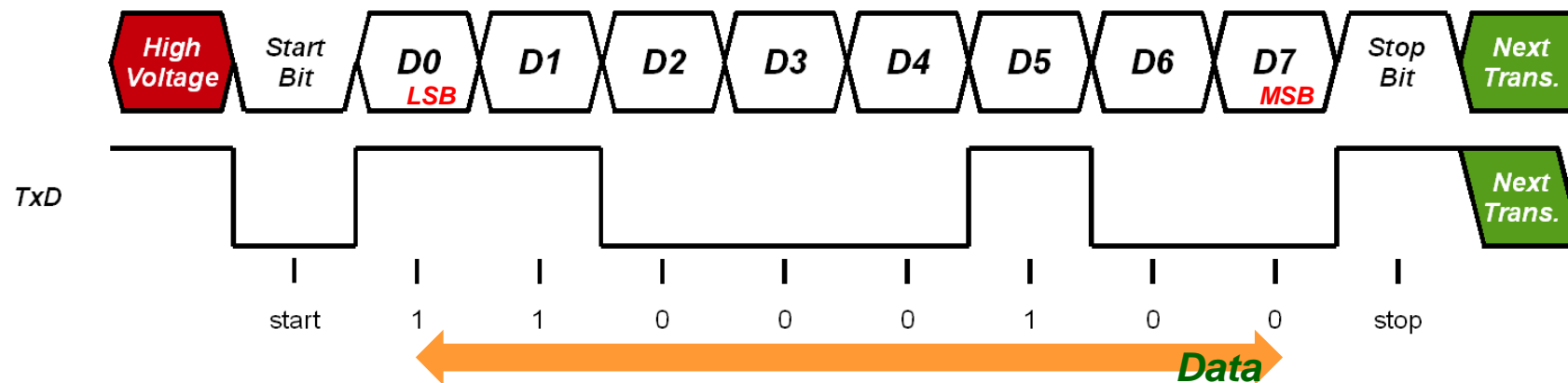


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UART Protocol

UART Transmit Protocol



Explanation

| | |
|------------------|----------------------------------|
| Start Bit | Transmit or Receive Start |
| Stop Bit | Transmit or Receive End |
| LSB | Least Significant Bit |
| MSB | Most Significant Bit |



實驗說明

```
u8 A[128],B[128];
u8 *temp1=&A[0],*temp2=&B[0];
u32 *temp3=(u32 *)A,*temp4=(u32 *)B;
int i;
```

```
printf("Matrix A= \r\n");
for(i=0;i<128;i++)
{
    *(temp1+i)=i;
    printf("%4o",*(temp1+i));
}printf("\r\n");
```

```
printf("8bit \r\n");
for(i=0;i<128;i++)
{
    *(temp2+i)=*(temp1+i);
    State_flag = 1;
    Stopwatch_counter();
}printf("\r\n");
```

```
printf("32bit \r\n");
for(i=0;i<32;i++)
{
    *(temp4+i)=*(temp3+i);
    State_flag = 2;
    Stopwatch_counter();
}printf("\r\n");
```

```
printf("8bit \r\n");
for(i=0;i<128;i++)
{
    printf("%4o",*(temp2+i) );
}
printf("\r\n");
printf("32bit \r\n");
for(i=0;i<128;i++)
{
    printf("%4o",*(((u8*)temp4)+i));
}
printf("\r\n");
```

實驗結果



```
COM7 - PuTTY
for 1:128 for 2:15
for 1:128 for 2:16
for 1:128 for 2:17
for 1:128 for 2:18
for 1:128 for 2:19
for 1:128 for 2:20
for 1:128 for 2:21
for 1:128 for 2:22
for 1:128 for 2:23
for 1:128 for 2:24
for 1:128 for 2:25
for 1:128 for 2:26
for 1:128 for 2:27
for 1:128 for 2:28
for 1:128 for 2:29
for 1:128 for 2:30
for 1:128 for 2:31
for 1:128 for 2:32

8bit
 0  1  2  3  4  5  6  7 10 11 12 13 14 15 16 17 20 21 22 23
24 25 26 27 30 31 32 33 34 35 36 37 40 41 42 43 44 45 46 47
50 51 52 53 54 55 56 57 60 61 62 63 64 65 66 67 70 71 72 73
74 75 76 77 100 101 102 103 104 105 106 107 110 111 112 113 114 115 116 117
120 121 122 123 124 125 126 127 130 131 132 133 134 135 136 137 140 141 142 143
144 145 146 147 150 151 152 153 154 155 156 157 160 161 162 163 164 165 166 167
170 171 172 173 174 175 176 177

32bit
 0  1  2  3  4  5  6  7 10 11 12 13 14 15 16 17 20 21 22 23
24 25 26 27 30 31 32 33 34 35 36 37 40 41 42 43 44 45 46 47
50 51 52 53 54 55 56 57 60 61 62 63 64 65 66 67 70 71 72 73
74 75 76 77 100 101 102 103 104 105 106 107 110 111 112 113 114 115 116 117
120 121 122 123 124 125 126 127 130 131 132 133 134 135 136 137 140 141 142 143
144 145 146 147 150 151 152 153 154 155 156 157 160 161 162 163 164 165 166 167
170 171 172 173 174 175 176 177
```