
```
unsigned char x[9];
unsigned short sum;

unsigned char filter(unsigned char data){
    x[0]=data;
    sum = sum+x[0]-x[8];
    return sum/8;
}
```

(25) Question 2. Assume a 1 Mbyte by 8-bit RAM is connected to the MC68HC812A4.

```c
void RAM_Init(void){
    MODE=0x3B; // special expanded narrow mode
    PEAR=0x2C; // enable E, R/W, LSTRB
    WINDEF=WINDEF|0x80; // enable DPAGE
    MXAR=0x0F; // enable A19-A16 on Port G
    CSCTL0=CSCTL0|0x10; // enable CSD
    CSCTL1=CSCTL1&0xEF; // CSD $7000 to $7FFF
    CSSTR0=(CSSTR0&0xFC)|0x02; // 2 cycle stretches on CSD
}
```

Part b) Write a memory write access function.

```c
void RAM_Write(long address, char data){
    char *pt;
    DPAGE = address>>12; // set address bits 19-12
    pt = (char *)(0x7000+(address&0x0FFF)); // set address bits 11-0
    *pt = data;
}
```

Part c) Write a memory read access function.

```c
char RAM_Read(long address){
    char *pt;
    DPAGE = address>>12; // set address bits 19-12
    pt = (char *)(0x7000+(address&0x0FFF)); // set address bits 11-0
    return *pt;
}
```

(25) Question 3. The gain needs to be 5/0.1 = 50. The gain is 1+490/10. So, the 9k resistor is the parallel combination of 10k||490k so that the effect of the bias currents is reduced.

(25) Question 4. Thread switch system

Part a) If an entry is added into POSITION A, then the sts 2,x and lds 2,x will not access the StackPt field.

Part b) We fix the bug by changing it to sts 4,x and lds 4,x

Part c) It is OK to add either 8-bit or 16-bit fields at POSITION B.