BIOS Practice: Reading and Writing Logical Devices (SIO)

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摘要 This document introduces SIO (System Input/Output) programming, especially the logic device read and write process for the IT8738 chip. First, enter PNP mode, then select the logic device, then read or write the device register, and finally exit PNP mode. The sample code shows the function implementation of entering and exiting PNP mode, selecting LDN, and reading and writing the logic device register.

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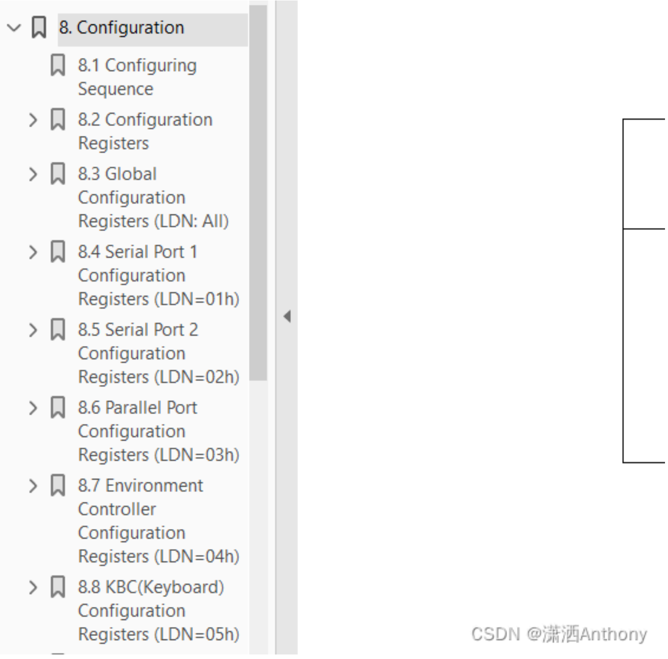
> A few days ago, I mentioned something about SIO. I have done some research on it before, but I have only studied a small part of its functions. I also participated in the programming of SIO when I was working on the Loongson BIOS, because this thing is definitely not used in laptops. Laptops use EC, and this SIO is equivalent to the EC on the PC board. Since a big guy asked me these questions, I immediately went back and found a document on the SIO chip. After reading it carefully, I found some missing parts. This article mainly records the principles of reading and writing logic devices and related programming.

Let's take the IT8738 chip as an example (the actual latest chip is unknown, and I only have this SPEC)

The following code has never been put into practice. I just wrote it according to the spec. Please correct me if it is wrong.

Logical Device Number (LDN). LDN is mentioned in the configuration section of the chip documentation. Let's take a look. They are 1, 2, 3, 4, 5, 6, 7, 8, A, F, 10, 11, 12, 19.



8. Configuration
8.1 Configuring Sequence
8.2 Configuration Registers
8.3 Global Configuration Registers (LDN: All)
8.4 Serial Port 1 Configuration Registers (LDN=01h)
8.5 Serial Port 2 Configuration Registers (LDN=02h)
8.6 Parallel Port Configuration Registers (LDN=03h)
8.7 Environment Controller Configuration Registers (LDN=04h)
8.8 KBC(Keyboard) Configuration Registers (LDN=05h)

Previously, we mentioned how to operate SIO in the SIO related knowledge and the preliminary implementation of Smart Fan. So, let's sort out the process of reading and writing logical devices:

1. Enter PNP mode

2. Select logical device

3. Read the register of the logical device

4. Write the value of a register of the logical device

5. Exit PNP mode

According to this process, we can directly write 5 functions:

1. Enter PNP mode

```
void EnterPnpMode(void)
```

```
{
    IoWrite8(0x2E, 0x87);
  IoWrite8(0x2E, 0x01);
  IoWrite8(0x2E, 0x55);
  IoWrite8(0x2E, 0x55);
  return;
}
```

2. Select logical device

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```
void SelectLDN (void)
{
  //LDN Selection
  unsigned int LDNumber;
  scanf("%x",&LDNumber);
  printf("Now LDN: %x",LDNumber);
  IoWrite8(0x2E,0x07);
  IoWrite8(0x2F,LDNumber);
  return;
}
```

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3. Read the register of the logical device

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```
void ReadLdnRegister(void)
{
  unsigned int row,col;
  unsigned int addr=0;
  unsigned int value[16][16];
  printf("--------------------------------------------------------------\n\n");
  printf("00  01  02  03  04  05  06  07  08  09  0A  0B  0C  0D  0E  0F\n");

  for(row=0;row<16;row++)
    {
       for(col=0;col<16;col++)
       {
         IoWrite8(0x2E,addr);
         value[row][col]=IoRead8(0x2F);

         if(value[row][col]<16){
           printf("0%X  ",value[row][col]);
         }else
            {
           printf("%x  ",value[row][col]);
            }
         addr++;
        }
       printf("\n");
    }
 return;
}
```

收起 ^

4. Write a register value of the logical device

```
void WriteLdnRegister(void)
{
       char order;
       unsigned int index, data;
       printf("Do you need to write registers? YES please intput W NO input Q:");
       scanf("%c",&order);
       if(order == 'W'){
           printf("Please input Index:");
           scanf("%x",&index);
           printf("Please input Data:");
           scanf("%x",&data);

           IoWrite8(0x2E,index);
           Iowrite8(0x2F,data);
       } else
```

```
        {
            printf("Exit write ld reg:");
          return;
        }
  return;
}
```

收起

5. Exit Pnp mode

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```
void ExitPnpMode (void)
{
  unsigned int  RegData = 0;
  IoWrite8(0x2E, 0x02);
  RegData = IoRead8(0x2F) | BIT1;
  IoWrite8(0x2E, 0x02);
  IoWrite8(0x2F, RegData);
  return;
}
```

Ok, with the above functions, we can write the main function. I won't write the whole thing, it's very easy, just write it in any way you want. Anyway, it has to be