Application Note for Linux

Oxford Serial Bridge Working On Linux

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Introduction

The OX16*95X and OX12PCI840 family can be used in Linux. This application note tells you how to set the correct configurations in Linux to make OXSEMI serial bridge products work normally

Description

OXSEMI serial bridge driver embedded in Linux

The OXSEMI serial bridge driver was originally embedded in Linux. Linux only recognize Vendor ID & Device ID of PCI954/952. If you take a look at /usr/src/linux.../drivers/char/serial.c and search for oxsemi, you shall find
{PCI_VENDOR_ID_OXSEMI, PCI_DEVICE_ID_OXSEMI_16PCI954, PCI_ANY_ID, PCI_ANY_ID, 0, 0, pbn_b0_4_115200}
{PCI_VENDOR_ID_OXSEMI, PCI_DEVICE_ID_OXSEMI_16PCI952, PCI_ANY_ID, PCI_ANY_ID, 0, 0, pbn_b0_2_921600}

and in /usr/src/linux.../include/linux/pci_ids.h, you will find

```
#define PCI_VENDOR_ID_OXSEMI                0x1415
#define PCI_DEVICE_ID_OXSEMI_12PCI840       0x8403
#define PCI_DEVICE_ID_OXSEMI_16PCI954       0x9501
#define PCI_DEVICE_ID_OXSEMI_16PCI95N       0x9511
#define PCI_DEVICE_ID_OXSEMI_16PCI954PP     0x9513
#define PCI_DEVICE_ID_OXSEMI_16PCI952       0x9521
```

Since only PCI954 and PCI952 are defined in serial.c, only these 2 products can be recognized correctly. That is why you can see 4 ports if the device ID is 0x9501. If the device ID is 0x950A which is the device ID of PCI954 dual ports, Linux can recognize the vendor ID but not the device ID. Then you will need to mount the port manually by using the "setserial" command, which will be described later.

Crystal Frequency

The original configuration of Linux can only recognize 115200(BAUD BASE) based on 1.8432MHz crystal. If the crystal frequency is 1.8432 x N MHz crystal, you will need to reconfigure the (BAUD BASE) to N times of 115200, which is 115200 x N. That explains why you need to setserial to BAUD BASE 115200 x N.

Setserial Command

For Device ID other than 0x9501 & 0x9521

1. Type "lspci -v"

Then you shall see

03:02.0 Serial controller: Oxford Semiconductor Ltd EXSYS EX-41092 Dual 16950 Serial adapter (prog-if 06 [16950])

Subsystem: Oxford Semiconductor Ltd: Unkown device 0000
Flags: medium devsel, IRQ 3
I/O ports at 9000 [size=32]
Memory at ea005000 (32-bit, non-prefetchable) [size=4K]
I/O ports at 9400 [size=32]
Memory at ea006000 (32-bit, non-prefetchable) [size=4k]
Capabilities: [40] Power Management version 2

2. Type "setserial /dev/ttyS4 port 0x9000 irq 3 uart 16950 baud_base 1152000"
3. Type "setserial /dev/ttyS5 port 0x9008 irq 3 uart 16950 baud_base 1152000" for the next port, and so on…
4. As you noticed we place 1152000 as the baud base because we are using 18.432MHz crystal in this case, which is 10 time of 1.8432MHz crystal.

If this is a 2 port device, then the 2 serial ports will be pointed to /dev/ttyS4 & /dev/ttyS5. Then you shall be able to make it work either in "KPPP" or "minicom"

For 0x9501 & 0x9521 device ID

1. You shall be able to find it on ttyS4~7 for 0x9501, and ttyS4~5 for 0x9521.
2. However if the crystal frequency is not 1.8432MHz, you still need to use the setserial command to set the baud base to the corresponding rate.