**Linux User Manual**

**PCI/PCIe Multi-Ports Driver Installation & Usage**

**Ver. 2.4**

**SystemBase Co., Ltd.**

**Document Information**

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| Information | Content |
| Abstract | This manual describes how to install and uninstall the Linux driver for PCI/PCIe Multi-port card series. |
| Version  History | V1.8, Written by Je-hwan Yoo on April 4th,2013 |
| V1.9, Written by Je-hwan Yoo on May 14th,2013 |
| V2.0, Written by Je-hwan Yoo on Jan 15th,2014 |
| V2.1, Written by Je-hwan Yoo on Jan 30th,2014 |
| V2.2, Written by Je-hwan Yoo on Feb 7th,2014 |
| V2.3, Written by Won Lee on Jan 11th,2016 |
| V2.4, Written by Won Lee on May 15th,2018 |

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1. **Introduction**

Linux driver for PCI/PCIe Multi-port card series is provided in the form of a script, you can install the driver without other operations.

1. **Supported Linux Kernel Versions**

Supported Kernel: From version 2.4.18 to 4.2

|  |  |  |
| --- | --- | --- |
| **Tested Linux** | | |
| **Linux distribution** | **Kernel version** | **Architecture** |
| Red hat 9.0 | - | i386 |
| CentOS 6 | - | i386 |
| Kubuntu 11.10 | - | i386 |
| Ubuntu 6.06.1 | 2.6.15 | i386/amd64 |
| Ubuntu 6.10 | 2.6.17 | i386/amd64 |
| Ubuntu 7.04 | 2.6.20 | i386/amd64 |
| Ubuntu 9.10 | 2.6.31 | i386/amd64 |
| Ubuntu 10.10 | 2.6.35 | i386/amd64 |
| Ubuntu 11.10 | 3.0.0 | i386/amd64 |
| Ubuntu 12.04.1 | 3.2.0 | i386/amd64 |
| Ubuntu 12.10 | 3.5.0 | i386/amd64 |
| Ubuntu 13.04 | 3.8.0 | i386/amd64 |
| Ubuntu 13.10 | 3.11.0 | i386/amd64 |
| Ubuntu 14.04 | 3.13.0 | i386/amd64 |
| Ubuntu 14.10 | 3.16.0 | i386/amd64 |
| Ubuntu 15.04 | 3.19.3 | i386/amd64 |
| Ubuntu 15.10 | 4.2.0 | i386/amd64 |
| Ubuntu 16.04 | 4.4.0 | I386/amd64 |
| Ubuntu 17.10 | 4.13.0 | I386/amd64 |
| Ubuntu 18.04 | 4.15.0 | I386/amd64 |

1. **Release Note**

* **Linux Driver Version 22.0**
  + (Update) Support to kernel version 4.4~4.15
* **Linux Driver Version 21.0**
  + (Update) Support to kernel version 3.13~4.2
* **Linux Driver Version 20.2**
  + (Update) Support to Multi-32/PCIe (bridge type)
* **Linux Driver Version 20.1**
  + (Bug Fix) Fix of “struct tty\_port” link
  + (Update) Support to kernel version 3.12
* **Linux Driver Version 20**
  + (Update) Support to kernel version 3.8

1. **Required for driver installation**
   1. Login as root user (Superuser).

You must login as root. You can check it from the prompt as shown below.

(Default: If you login without the root account, it will show $, but when you did, # is displayed.)

|  |
| --- |
| sysbas@utu:/tmp$ |

<Root Account>

|  |
| --- |
| root@utu:/tmp# |

<Unprivileged Account>

* 1. GCC (GNU C Compiler)

Check if you have the GCC installed. When you type ‘gcc –v’ and the result shows “gcc: command not found”, the GCC is not installed. You must install it before installing the driver.

|  |
| --- |
| sysbas@utu:/tmp$ gcc -v  Using built-in specs.  COLLECT\_GCC=gcc  COLLECT\_LTO\_WRAPPER=/usr/lib/gcc/i686-linux-gnu/4.6.1/lto-wrapper  Target: i686-linux-gnu  Configured with: ../src/configure -v --with-pkgversion='Ubuntu/Linaro 4.6.1-9ubuntu3' --with-bugurl=file:///usr/share/doc/gcc-4.6/README.Bugs --enable-languages=c,c++,fortran,objc,obj-c++,go --prefix=/usr --program-suffix=-4.6 --enable-shared --enable-linker-build-id --with-system-zlib --libexecdir=/usr/lib --without-included-gettext --enable-threads=posix --with-gxx-include-dir=/usr/include/c++/4.6 --libdir=/usr/lib --enable-nls --with-sysroot=/ --enable-clocale=gnu --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-plugin --enable-objc-gc --enable-targets=all --disable-werror --with-arch-32=i686 --with-tune=generic --enable-checking=release --build=i686-linux-gnu --host=i686-linux-gnu --target=i686-linux-gnu  Thread model: posix  gcc version 4.6.1 (Ubuntu/Linaro 4.6.1-9ubuntu3) |

<GCC installed>

|  |
| --- |
| sysbas@utu:/tmp$ gcc -v  gcc: command not found |

<GCC not installed>

* 1. Kernel Source

Check whether the kernel source files are installed. Type ‘cd /usr/src’ and check the result. If you can't found kernel source under the directory, you must install the kernel source files before installing the driver.

|  |
| --- |
| sysbas@utu:/tmp$ cd /user/src  sysbas@utu:/src$ ls  linux-headers-3.0.0-12 linux-headers-3.0.0-12-generic |

<Kernel source installed>

|  |
| --- |
| sysbas@utu:/tmp$ cd /user/src  sysbas@utu:/src$ ls |

<Kernel source not installed>

* 1. Make

Check whether the “make” is installed. Type ‘make –v’ and check the result. When it shows “make: command not found”, the “make” is not installed. You must install make. You must install the “make” before installing the driver.

|  |
| --- |
| sysbas@utu:/tmp$ make -v  GNU Make 3.81  Copyright (C) 2006 Free Software Foundation, Inc.  This is free software; see the source for copying conditions.  There is NO warranty; not even for MERCHANTABILITY or FITNESS FOR A  PARTICULAR PURPOSE.  This program built for i686-pc-linux-gnu |

<Make installed>

|  |
| --- |
| sysbas@utu:/tmp$ make -v  make: command not found |

<Make not installed>

1. **Installation**
2. Please check whether the power is off from your PC.
3. Install a PCI/PCIe Multi-port card in the PCI/PCIe slot of the PC.
4. If you have any external cables for each port, please connect the cables to the card.
5. Turn on the PC.
6. After the Linux boots, login with the administrator ID as root.
7. Run the device driver file named “eh\_async\_mpdrv.v22.sh”.

The device driver file is an executable file. You could just type the name in shell followed by “./”.

After you execute the file, you can see a sub directory named “eh\_async\_mpdrv.v22” with installation information like a below image.

You will see the followings: model name of the multiport, type of serial interface-RS232/RS422/RS485, port name and version in the installation information

|  |
| --- |
| root@utu:/tmp# ./eh\_async\_mpdrv.v22.sh  Verifying archive integrity... All good.  Uncompressing Enhanced Async Multi-Port(PCI/PCIe) Linux device drvier installer....................  ================================================================  Enhanced Async Multi-Port(PCI/PCIe) Linux Device Driver  Version : 22.0 revision: 2018-05-15  ================================================================  1 board(s) installed  Board No.1 : Multi-4 PCI (rev b0)  /dev/ttyMP0 (RS232 , 16C105X)  /dev/ttyMP1 (RS232 , 16C105X)  /dev/ttyMP2 (RS232 , 16C105X)  /dev/ttyMP3 (RS232 , 16C105X)  root@utu:/tmp# |

1. **Remove**
2. Go to the directory where the driver is installed.

If you installed the driver at “~/tmp”, please go to “~/tmp/eh\_async\_mpdrv.v22” directory.

1. Run **Remove** command as follows.

#./Remove

|  |
| --- |
| root@utu:/tmp/eh\_async\_mpdrv.v22# ls  Install Remove async\_multiport ioctl multidrop\_test  root@utu:/tmp/eh\_async\_mpdrv.v22# ./Remove |

1. All the installed files will be removed automatically after executing **Remove** command.

|  |
| --- |
| Remove Multiports PCI/PCIe Driver..!!  remove device(/dev)…..done  modify rc.local…..done  root@utu:/tmp/eh\_async\_mpdrv.v22# |

1. **Testing**

#cd async\_multiport

#./sb\_test [Port Name] [Baudrate] [TestMode]

If you want to know how to use the sb\_test, you just type the name without any argument. And then you can see the method of the usage.

|  |
| --- |
| root@utu:/tmp/eh\_async\_mpdrv.v19/async\_multiport# ./sb\_test  Usage: ./sb\_test [Port Name] [Baudrate] [TestMode]  Port Name : /dev/ttyMP0 ~ /dev/ttyMP32  Baudrate : 9600, 19200, ...  TestMode : 0(Loopback) 1(Send) 2(Recv)  root@utu:/tmp/eh\_async\_mpdrv.v17/async\_multiport# |

Usage: ./sb\_test [Port Name] [Baudrate] [TestMode]

Port Name : /dev/ttyMP0 ~ /dev/ttyMP32

Baudrate : 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600

TestMode : 0 (Loopback)

1 (Send)

2 (Receive)

Example :

$./sb\_test /dev/ttyMP0 9600 0

$./sb\_test /dev/ttyMP5 921600 0

$./sb\_test /dev/ttyMP3 115200 1

(Note) There is a blank space after “/sb\_test“ and before “/dev/”.

After you connect the loopback connector to the port you wish to test, you can test it by using the loopback mode.

The test pattern is “abcdefghijklmnopqrstuvwxyz” and the program generates characters from “a” to “z” repeatedly increasing by one character.

|  |
| --- |
| root@utu:/tmp/eh\_async\_mpdrv.v19/async\_multiport# ./sb\_test /dev/ttyMP0 9600 0  Loopback Test Mode !  a  ab  abc  abcd  abcde  abcdef  abcdefg  abcdefgh  abcdefghi  abcdefghij  abcdefghijk  abcdefghijkl  abcdefghijklm  abcdefghijklmn  abcdefghijklmno  abcdefghijklmnop |

When the multi-port card driver is installed correctly, you will see the test result repeatedly as shown above.