

The logo for innodisk, featuring the word "innodisk" in white lowercase letters on a red rectangular background. A small red square is positioned at the top right corner of the main red rectangle.

innodisk

EMP2 SERIES

mPCIe to Serial COM

User Manual

Rev 1.3

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Revision History

Revision	Date	Description
1.0	2015/10/21	Initial Release
1.1	2016/10/4	Add products of EMP2-X4S1& EMP2-X4S2
1.2	2017/05/31	Remove EMP2-X401
1.3	2017/11/30	<ol style="list-style-type: none">1. Add the product of EGP2-X4012. Add a NOTE of Windows embedded in section 1.1.

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Overview

This manual describes how to implement EMP2 mPCIe to serial COM cards of the following products.

Product No.	RS232	RS485HD	RS485FD	Switch Method
EMP2-X202	X	O	O	Hardware
EMP2-X402	X	O	O	Hardware
EMP2-X203	O	X	X	N/A
EMP2-X403	O	X	X	N/A
EMP2-X801	O	O	O	Software
EMP2-X404	O	O	O	Software
EMP2-X4S1	X	X	O	N/A
EMP2-X4S2	X	O	O	N/A
EGP2-X401	O	O	O	Software

Note: HD: Half Duplex, FD: Full Duplex

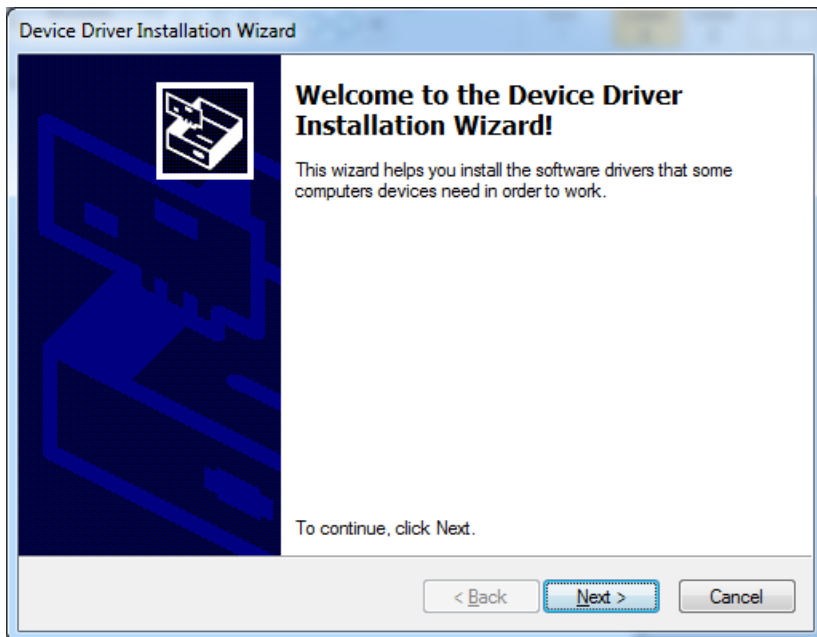
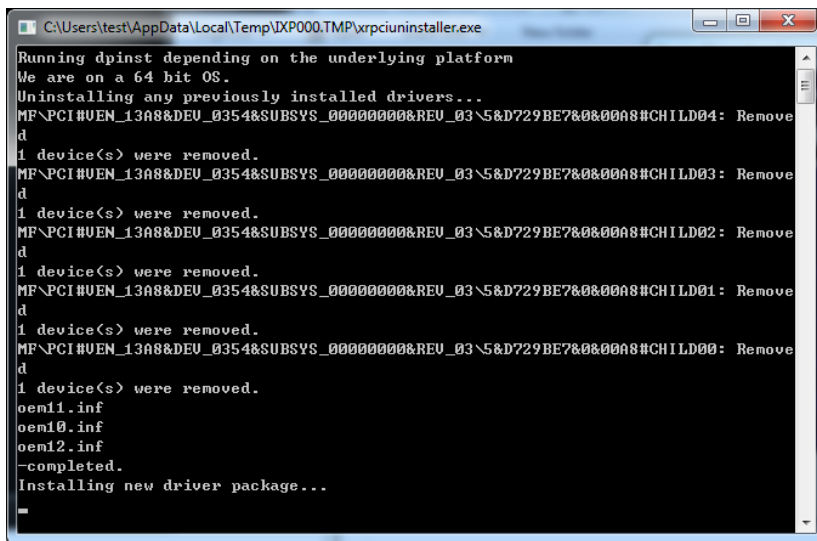
1. Windows

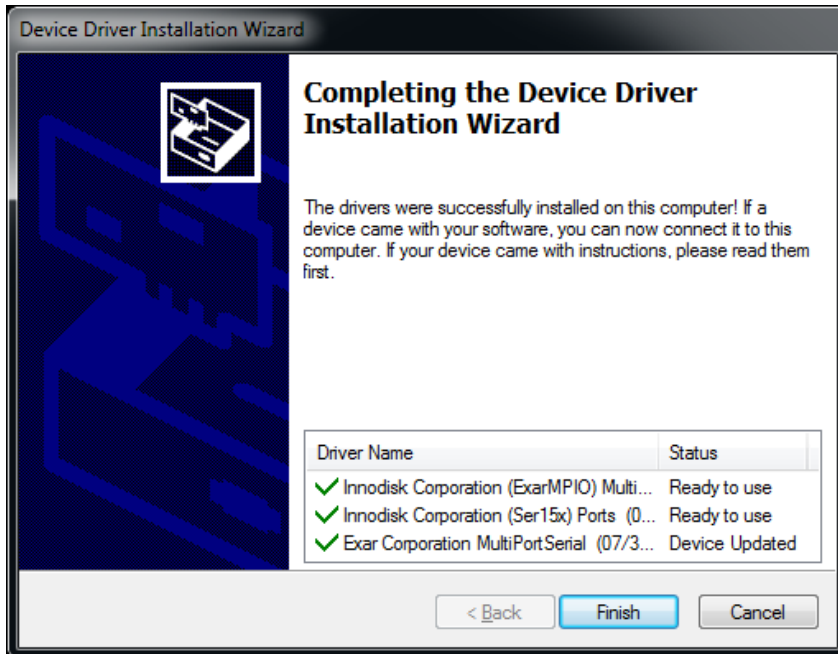
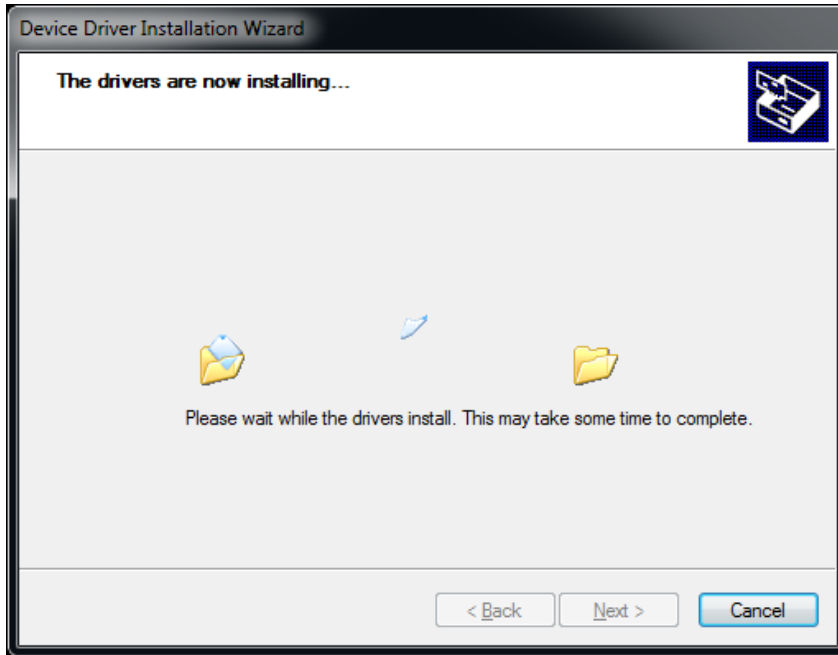
1.1. Install Driver

This section is applicable to ALL products.

Please notice that the driver name including “Adj” is for EMP2 -X404/X801 and EGP2-X401. The driver name including “Fixed” is for EMP2-X202/X203/X402/X403/X4S1/X4S2.

Double click the driver package to start. If driver is already existed in the OS, it will be removed automatically before installation.





NOTE1: If you encounter an error while executing the driver, please download **“Microsoft Visual C++ Redistributable Package”** then install first.
<https://www.microsoft.com/en-us/download/details.aspx?id=29>

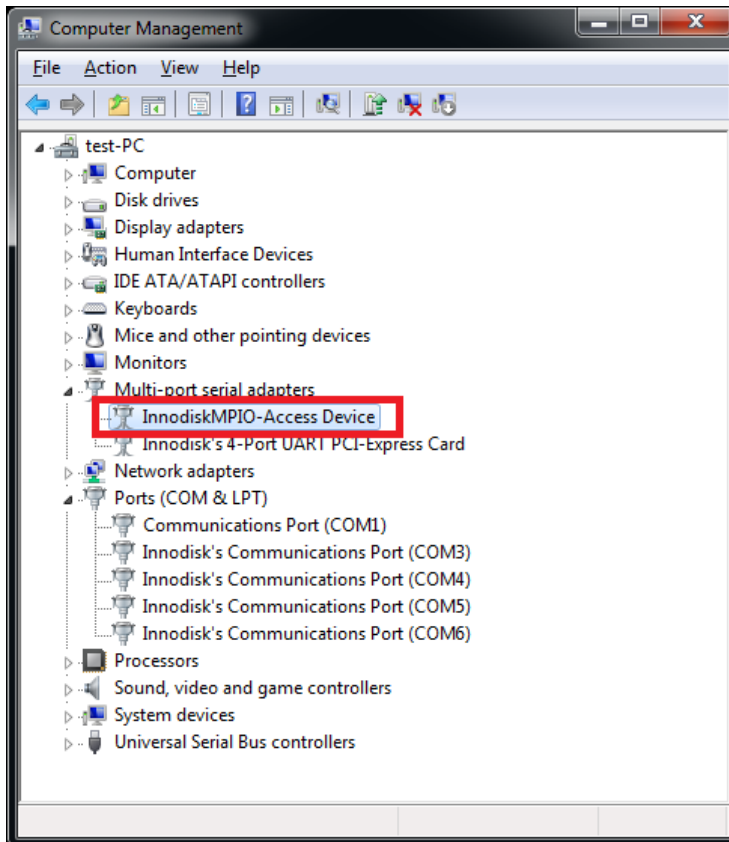
NOTE2: Please confirm Window Embedded has included “windows generic multifunction card driver” inbox driver.
 This package would be “WinEmb-INF-mf.cab”.
 You can add it by dism command online or WES ICE tool offline. Also you can modify the existed template directly to add mf driver section.

1.2. Switch Mode by Software (for EMP2-X404/X801, EGP2-X401)

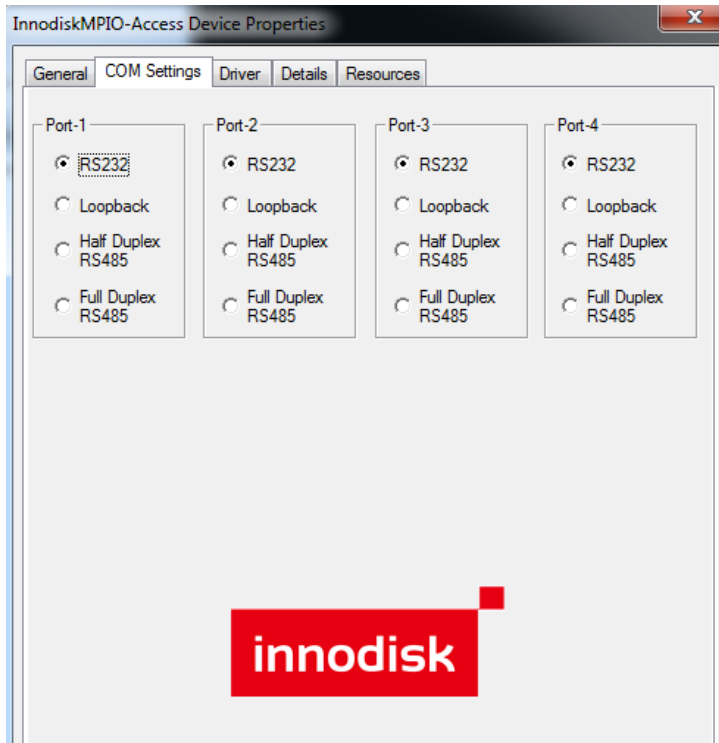
This section is applicable to following products.

Product No.	RS232	RS485HD	RS485FD	Switch Method
EMP2-X404	○	○	○	Software
EMP2-X801	○	○	○	Software
EGP2-X401	○	○	○	Software

In Device Manager, right click the mouse to enter “properties” in **“InnodiskMPIO-Access Device”**.



In “**COM Settings**”, you can select different mode among RS232, Loopback, RS485HD and RS485FD.

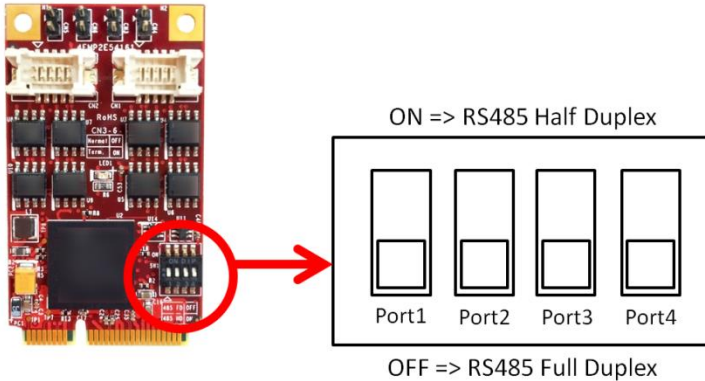


1.3. Switch Mode by Hardware (for EMP2-X202/X402)

This section is applicable to following products

Product No.	RS232	RS485HD	RS485FD	Switch Method
EMP2-X202	X	O	O	Hardware
EMP2-X402	X	O	O	Hardware

Switch mode between RS485 Half Duplex and Full Duplex by using DIP switch. Please refer to the following picture:

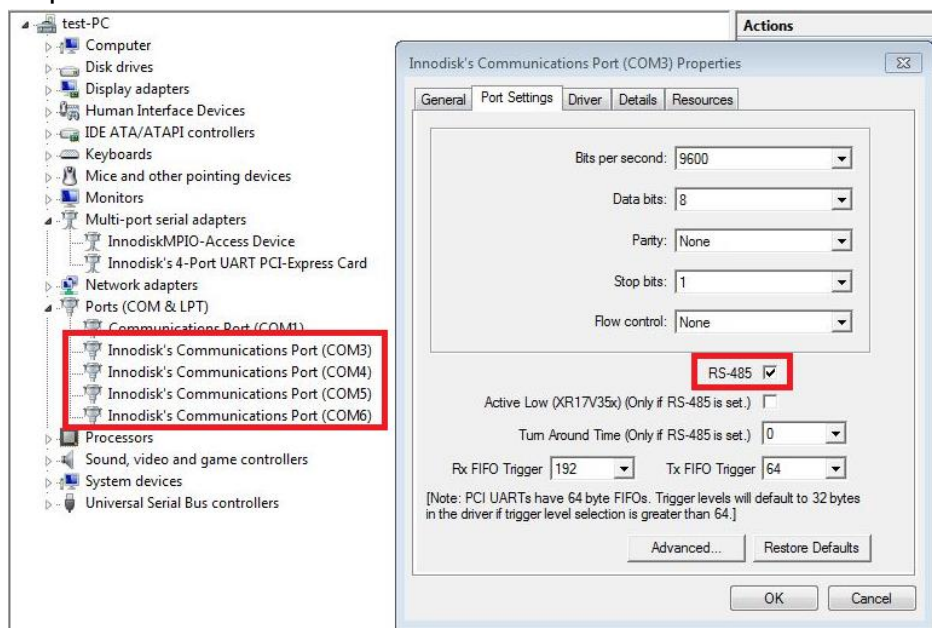


1.4. Enable RS-485 checkbox for RS-485 Half Duplex Mode

This section is applicable to ALL products.

In Device Manager, right click the mouse to enter “properties” in “**Innodisk’s Communications Port (COM“N”)**”. (“N” depends on the setting of real environment.)

In “**Port Settings**”, please check RS-485 checkbox when using RS-485 Half Duplex Mode



2. Linux

Here we use Ubuntu 14.04 for example.

2.1. Install Driver

This section is applicable to ALL products.

Step1. Go to driver folder.

Step2. Type command **“make”**.

Step3. Type command **“sudo make install”**

```
root@innodisk-System-Product-Name: /home/innodisk/emp2/driver
root@innodisk-System-Product-Name:/home/innodisk/emp2/driver# make
make -C /lib/modules/`uname -r`/build SUBDIRS=/home/innodisk/emp2/driver modules
make[1]: Entering directory `/usr/src/linux-headers-3.13.11.8-custom'
  CC [M] /home/innodisk/emp2/driver/xr17v35x.o
/home/innodisk/emp2/driver/xr17v35x.c: In function 'receive_chars':
/home/innodisk/emp2/driver/xr17v35x.c:558:21: warning: unused variable 'tty' [-Wunused-variable]
 struct tty_struct *tty = up->port.state->port.tty;
                   ^
Building modules, stage 2.
MODPOST 1 modules
  CC      /home/innodisk/emp2/driver/xr17v35x.mod.o
  LD [M]  /home/innodisk/emp2/driver/xr17v35x.ko
make[1]: Leaving directory `/usr/src/linux-headers-3.13.11.8-custom'
root@innodisk-System-Product-Name:/home/innodisk/emp2/driver# sudo make install
cp xr17v35x.ko /lib/modules/3.13.11.8-custom/kernel/drivers/char
depmod -a
root@innodisk-System-Product-Name:/home/innodisk/emp2/driver#
```

2.2. Install EMP2 Mode-Control Tool

This section is applicable to ALL products.

Step1. Go to tools folder.

Step2. Type command **“make”**.

Step3. Type command **“sudo make install”**

```
root@innodisk-System-Product-Name: /home/innodisk/emp2/tools
root@innodisk-System-Product-Name:/home/innodisk/emp2# cd tools
root@innodisk-System-Product-Name:/home/innodisk/emp2/tools# make
gcc regctl.c -o emp2reg
root@innodisk-System-Product-Name:/home/innodisk/emp2/tools# sudo make install
# clean old stuff in /sbin
if [ -f /sbin/emp2reg ]; then \
    rm -f /sbin/emp2*; \
fi
# install script and application
install -o 755 emp2cfg /usr/sbin/
install -o 755 emp2init /usr/sbin/
install -o 755 -s emp2reg /usr/sbin/
# install common definition items in /usr/lib/emp2
mkdir -p /usr/lib/emp2/
install -o 644 emp2lib /usr/lib/emp2/
root@innodisk-System-Product-Name:/home/innodisk/emp2/tools#
```

2.3. Switch Mode by Software (for EMP2-X404/X801, EPG2-X401)

This section is applicable to following products.

Product No.	RS232	RS485HD	RS485FD	Switch Method
EMP2-X404	○	○	○	Software
EMP2-X801	○	○	○	Software
EGP2-X401	○	○	○	Software

After installing driver and control tools, you can simply execute below command to initial EMP2 device.

Notice, all EMP2 control tools need to be executed as root.

- **COMMAND: `emp2init`**
The `emp2init` will help you check if the driver has been loaded on the system and setup all ports following the configuration file (`/etc/emp2.cfg`). If the configuration file did not exist, it will create a default one for you, all ports will be configured as RS232 mode by default.

Notice that, the `emp2init` must be executed after system boot up every time to make sure the driver loaded well and all ports be configured as you want.

- **COMMAND: `emp2cfg <port> <mode>`**
The `<port>` specify which port you want to configure, start from 1. And the `<mode>` specify the target mode, "lo" for LOOPBACK, "232" for RS-232, "485hd" for RS485 Half-Duplex, and "485fd" for RS-485 Full-Duplex.

```

root@innodisk-System-Product-Name: /
root@innodisk-System-Product-Name:/# emp2init
Found Exar device 0354 (4 ports)
Switch port 1 to mode 232 finished
Switch port 2 to mode 232 finished
Switch port 3 to mode 232 finished
Switch port 4 to mode 232 finished
root@innodisk-System-Product-Name:/# emp2cfg 1 lo
Switch port 1 to mode lo finished
root@innodisk-System-Product-Name:/# emp2cfg 2 232
Switch port 2 to mode 232 finished
root@innodisk-System-Product-Name:/# emp2cfg 3 485fd
Switch port 3 to mode 485fd finished
root@innodisk-System-Product-Name:/# emp2cfg 4 485hd
Switch port 4 to mode 485hd finished
root@innodisk-System-Product-Name:/# emp2init
Found Exar device 0354 (4 ports)
Switch port 1 to mode lo finished
Switch port 2 to mode 232 finished
Switch port 3 to mode 485fd finished
Switch port 4 to mode 485hd finished
root@innodisk-System-Product-Name:/#

```

- **COMMAND:** `emp2init reset`
Reset all port to default mode RS232.

```

root@innodisk-System-Product-Name: /
root@innodisk-System-Product-Name: /# emp2init reset
Found Exar device 0354 (4 ports)
Reset EMP2 configuration
Switch port 1 to mode 232 finished
Switch port 2 to mode 232 finished
Switch port 3 to mode 232 finished
Switch port 4 to mode 232 finished
root@innodisk-System-Product-Name: /# cat /etc/emp2.cfg
#
# generated by emp2init, don't modify it
# you can reset the configuration file by execute "emp2init reset"
#
PORTS=4
PORT1FIX=no
PORT1MODE=232
PORT2FIX=no
PORT2MODE=232
PORT3FIX=no
PORT3MODE=232
PORT4FIX=no
PORT4MODE=232
root@innodisk-System-Product-Name: /# █

```

2.4. Switch Mode by Hardware (for EMP2-X202/X402)

Please follow instructions in [1.3. Switch Mode by Hardware](#) to configure DIP switch.

This section is applicable to following products.

Product No.	RS232	RS485HD	RS485FD	Switch Method
EMP2-X202	X	O	O	Hardware
EMP2-X402	X	O	O	Hardware

After changing DIP switch between RS485HD and RS485FD, you need to execute the command `emp2init reset` to take effect, then you can also check the configuration file (`/etc/emp2.cfg`) to make sure it is in the correct mode.

Notice, all EMP2 control tools need to be executed as root.

```

root@innodisk-System-Product-Name: /home/innodisk
root@innodisk-System-Product-Name: /home/innodisk# emp2init reset
Found Exar device 0354 (4 ports)
Reset EMP2 configuration
root@innodisk-System-Product-Name: /home/innodisk# cat /etc/emp2.cfg
#
# generated by emp2init, don't modify it
# you can reset the configuration file by execute "emp2init reset"
#
PORTS=4
PORT1FIX=yes
PORT1MODE=485hd
PORT2FIX=yes
PORT2MODE=485hd
PORT3FIX=yes
PORT3MODE=485fd
PORT4FIX=yes
PORT4MODE=485fd
root@innodisk-System-Product-Name: /home/innodisk# █

```

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