

The logo for innodisk features the word "innodisk" in a white, lowercase, sans-serif font. The text is centered within a red rectangular background. A small red square is positioned at the top right corner of the main red rectangle, creating a stylized graphic element.

**innodisk**

# **EMP2/EGP2 SERIES**

mPCIe/M.2 to Serial COM

User Manual

Rev 1.5

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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	1. Add the product of EGP2-X401 2. Add a NOTE of Windows embedded in section 1.1.
1.4	2018/03/08	Add NOTE of digital certificate for Windows 7 driver installation in section 1.1.
1.5	2018/4/11	Change file name to EMP2/EGP2.
1.6	2019/5/13	Modify 1.4, Half to Half/Full

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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

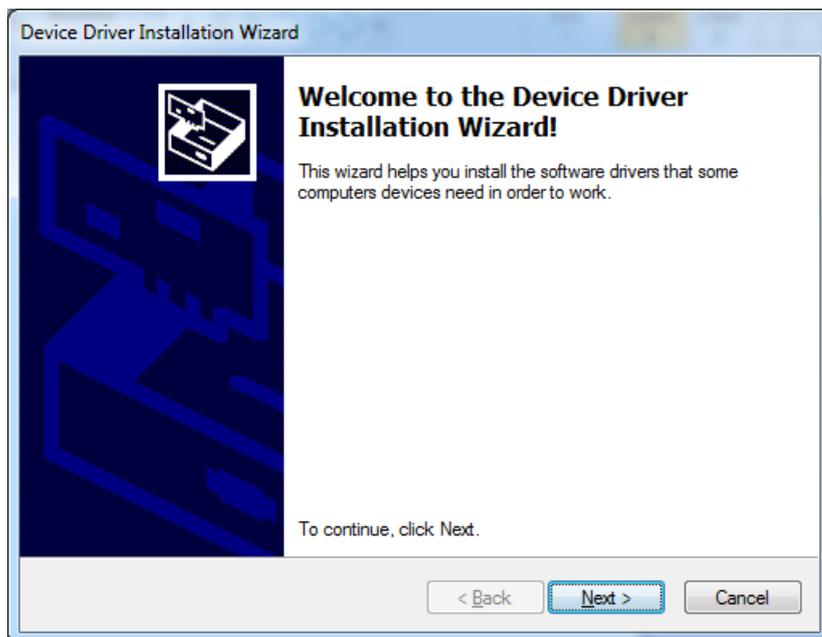
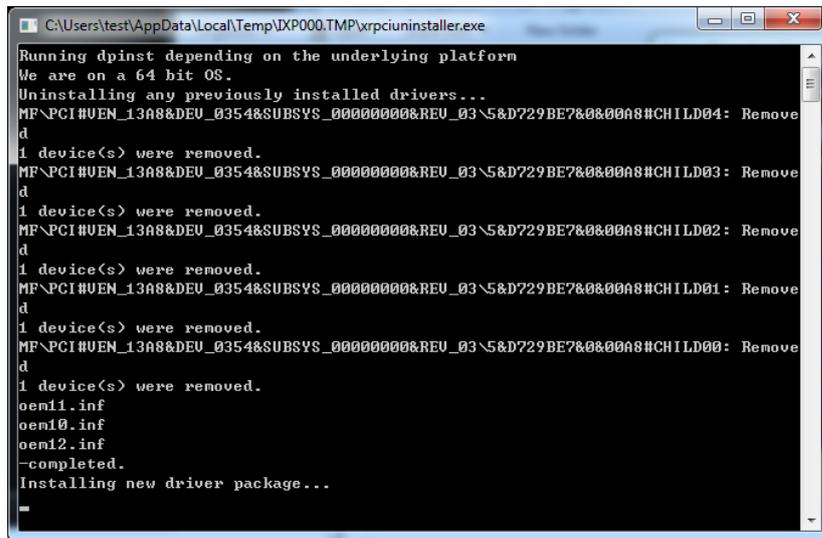
# 1. Windows

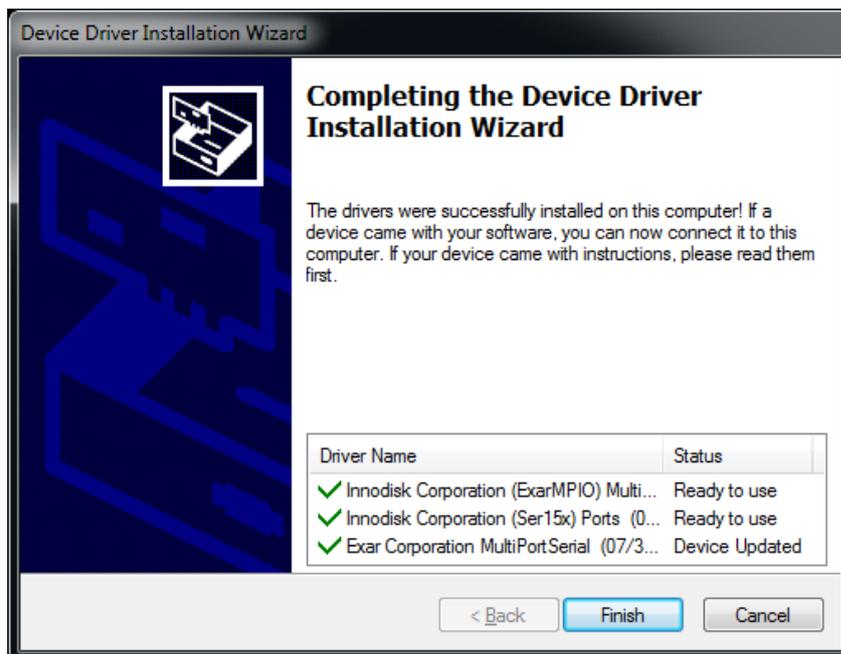
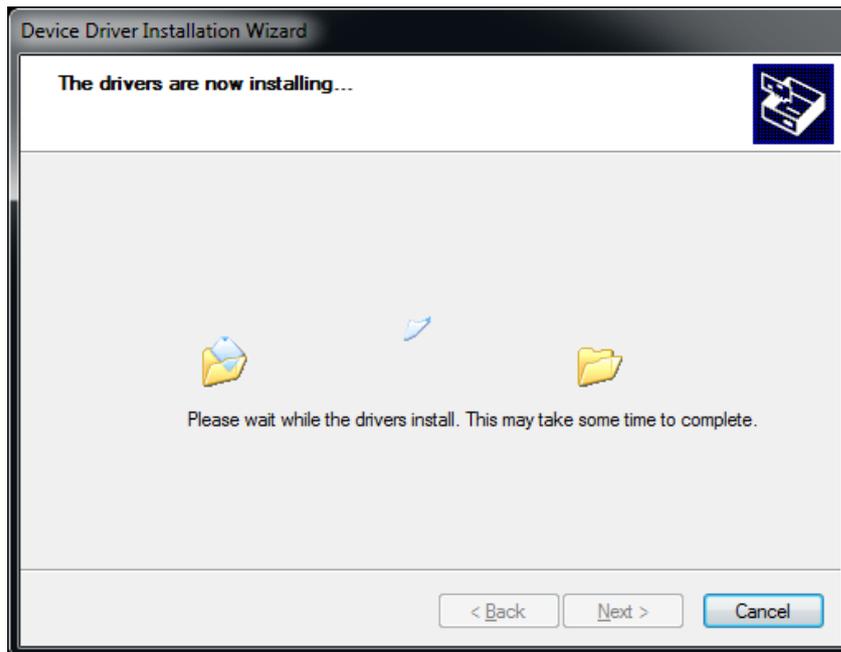
## 1.1. Install Driver

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 Windows 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.

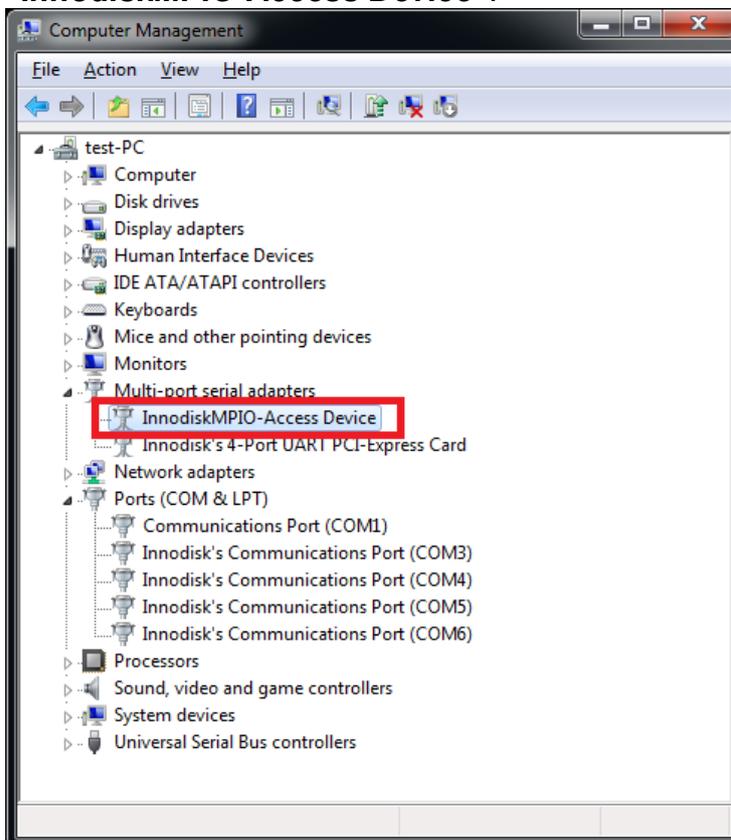
**NOTE3:** Drivers for Windows 64bit need to be signed with digital certificate. The driver is signed with SHA-2 certificate  
Windows 7 must be installed the hotfix **KB3033929** to support SHA-2 code signing.  
<https://technet.microsoft.com/en-ie/library/security/3033929>

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

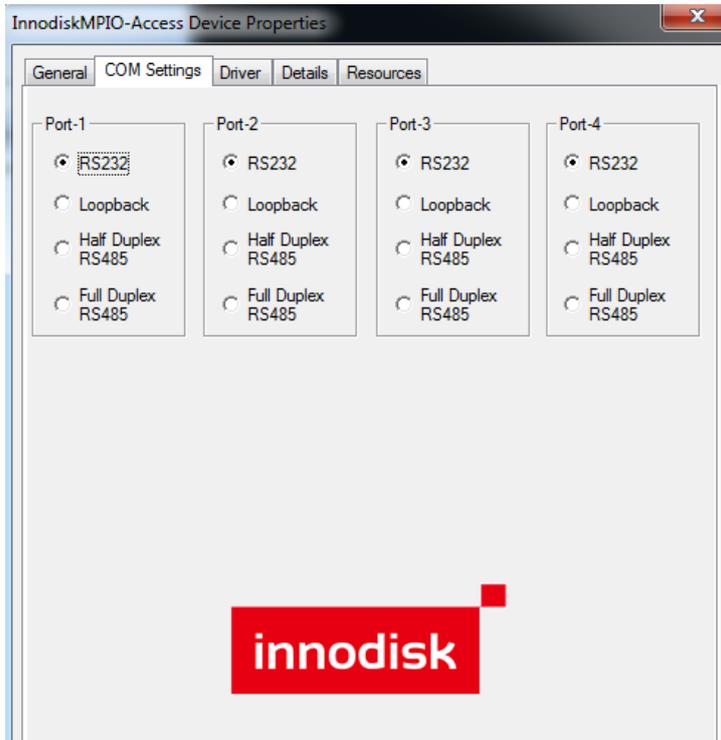
This section is applicable to following products.

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.

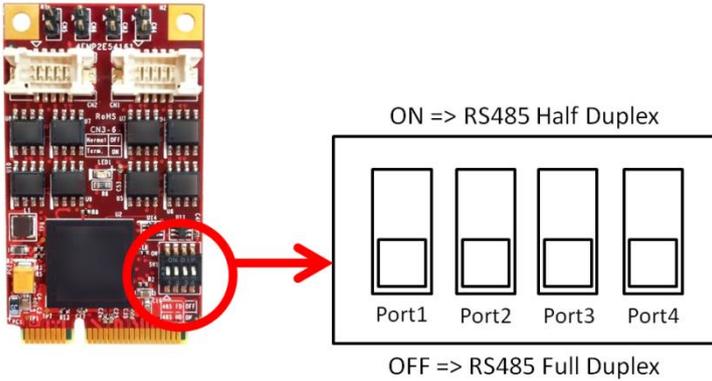


### 1.3. Switch Mode by Hardware (for EMP2-X202/X402)

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:

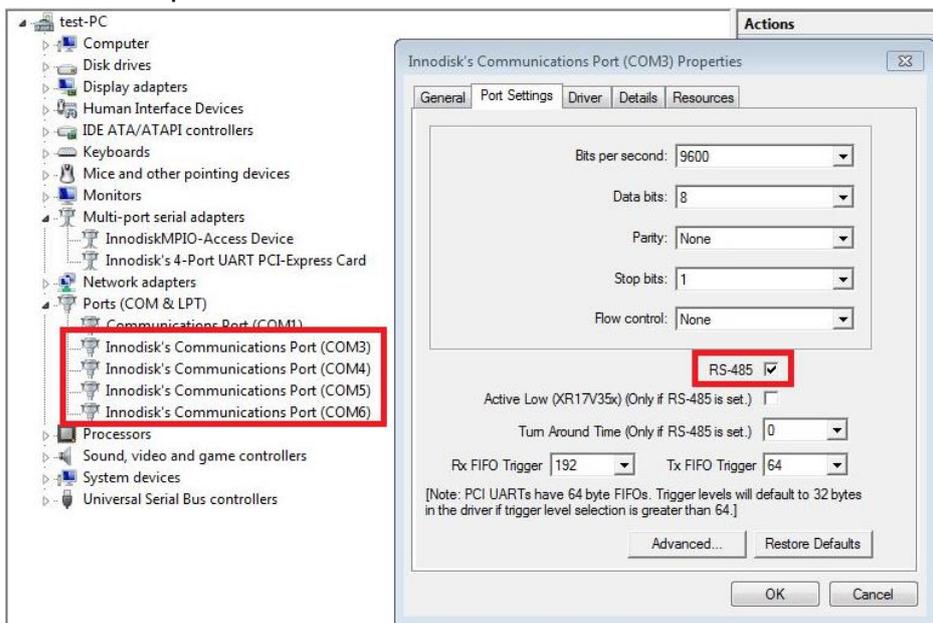


### 1.4. Enable RS-485 checkbox for RS-485 Half/Full Duplex Mode

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 and Full 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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