

ExP2 Fintek Series

mPCIe/M.2 to Serial COM

User Manual

Rev 1.3

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Revision History

Revision	Date	Description
1.0	2023/03/28	Initial Release
1.1	2023/09/12	Add boot config and boot up script
1.2	2024/04/15	Add 2.10 FAQ and 2.10.1 workaround document for RHEL kernel 5.14 API type not compatible with mainstream kernel.
1.3	2025/07/10	Add EGP2-X4S1 operation

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Overview

This manual describes how to implement ExP2 Fintek series mPCIe/M.2 to Serial COM cards of the following products.

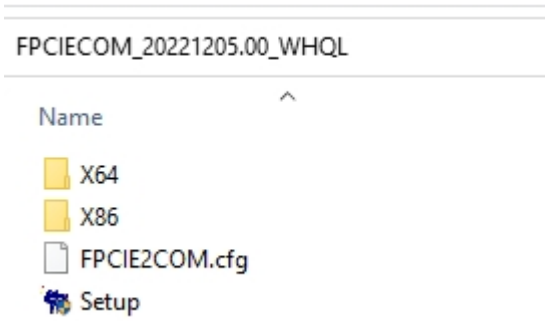
Product No.	RS232	RS485	RS422	Switch Method
EMP2-X206	O	O	O	Software
EMP2-X406	O	O	O	Software
EMP2-X207	O	X	X	Fixed Mode
EMP2-X407	O	X	X	Fixed Mode
EGP2-X203	O	X	X	Fixed Mode
EGP2-X403	O	X	X	Fixed Mode
EGP2-X204	O	O	O	Software
EGP2-X404	O	O	O	Software
EGP2-X4S1	X	O	O	Hardware

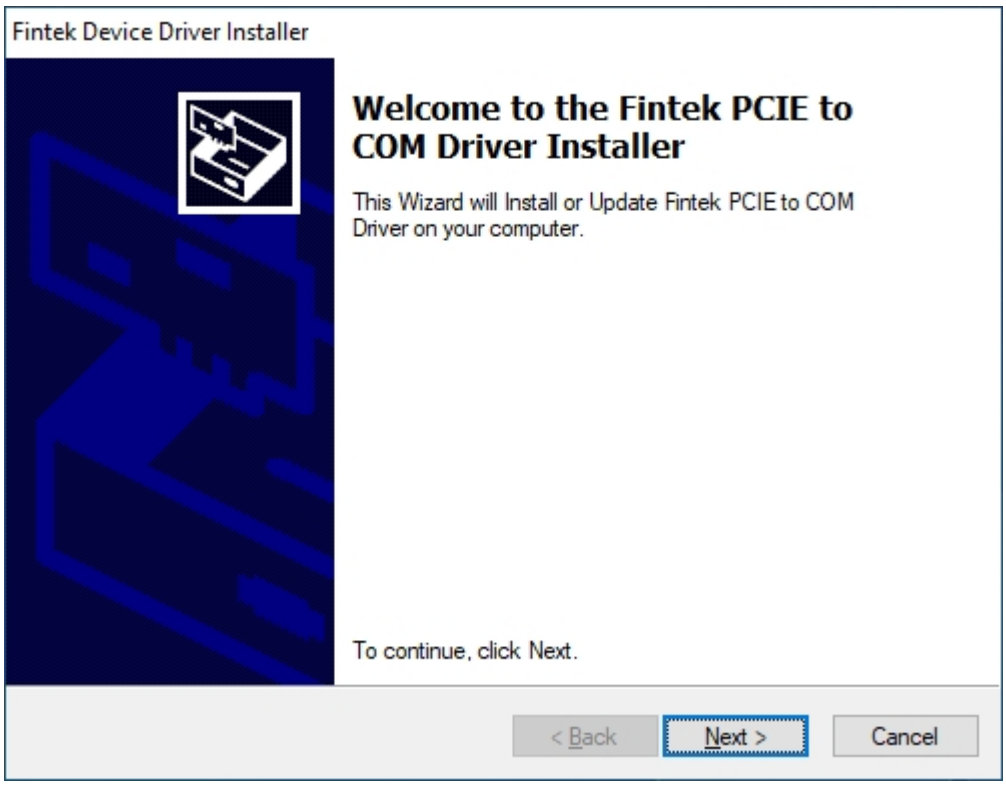
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1. Windows

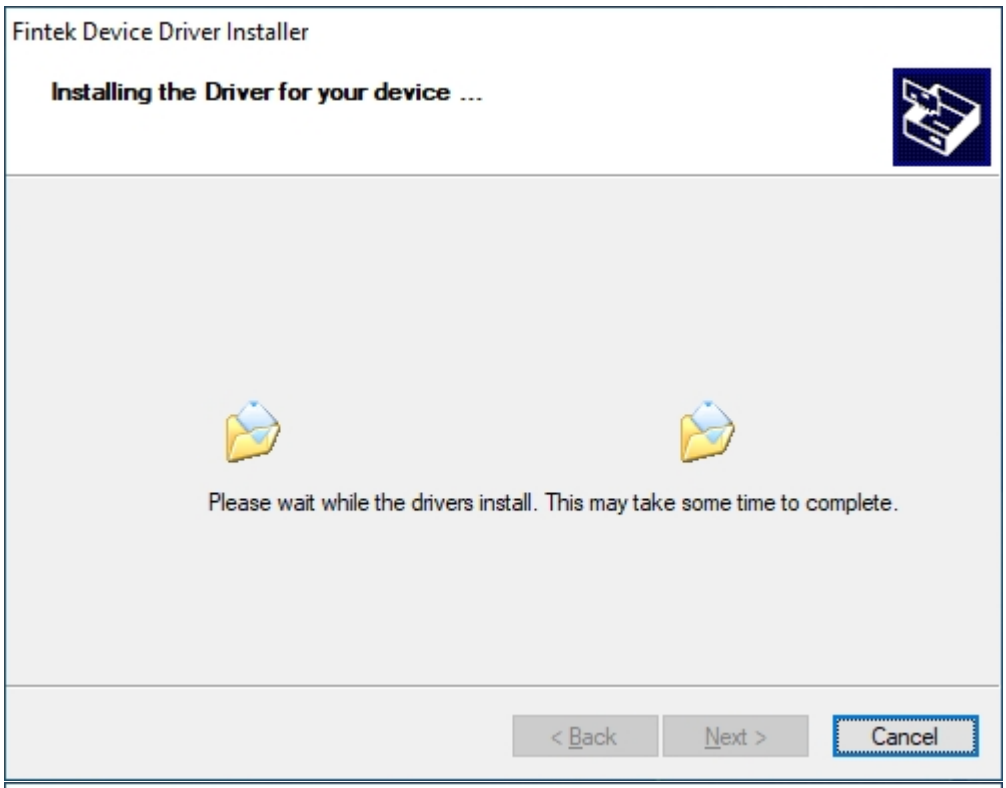
1.1. Install Driver

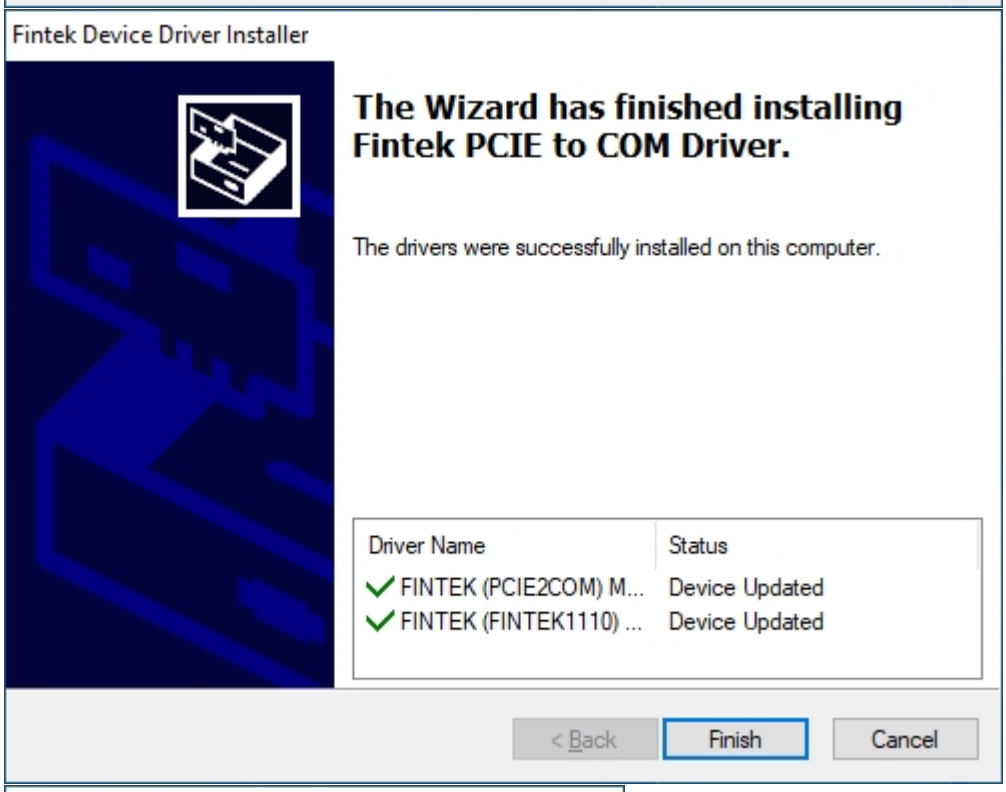
This section is applicable to ALL products. Double click the driver package to start. Need reboot after installing the driver.

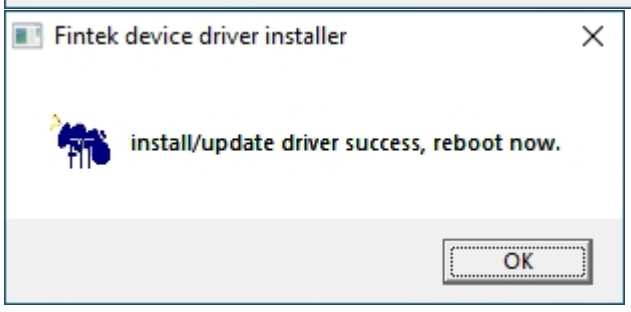




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1.2. Fix mode module

Can use directly after installing driver.

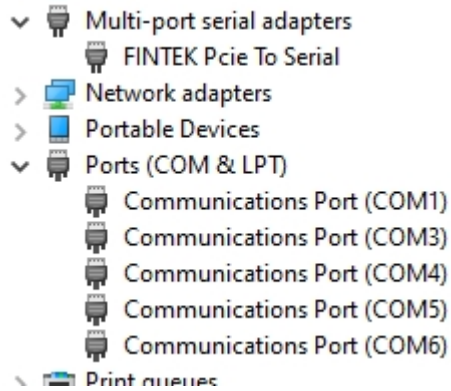
Product No.	RS232	RS485	RS422	Switch Method
EMP2-X207	O	X	X	Fixed Mode
EMP2-X407	O	X	X	Fixed Mode
EGP2-X203	O	X	X	Fixed Mode
EGP2-X403	O	X	X	Fixed Mode

1.3. Switch Mode Module by Software

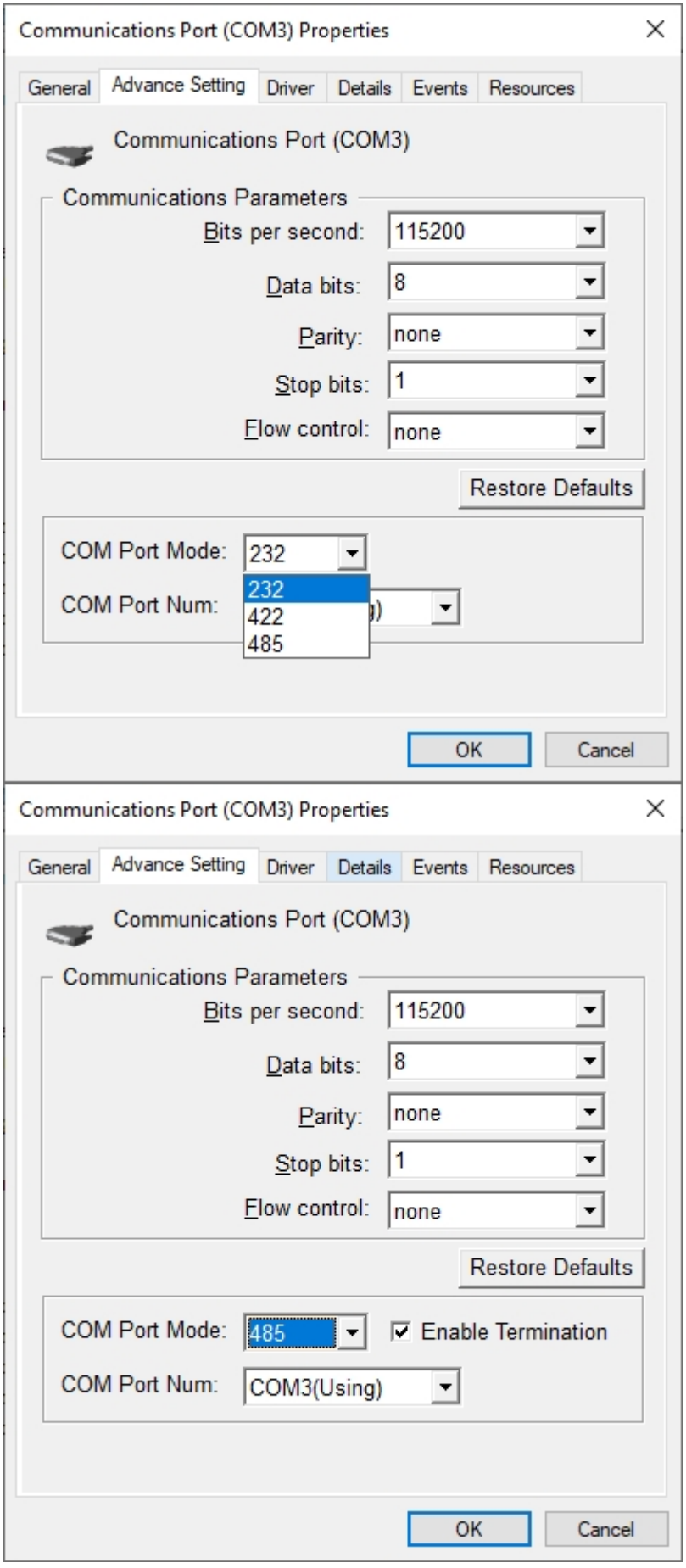
This section is applicable to following products.

Product No.	RS232	RS485	RS422	Switch Method
EMP2-X206	O	O	O	Software
EMP2-X406	O	O	O	Software
EGP2-X204	O	O	O	Software
EGP2-X404	O	O	O	Software

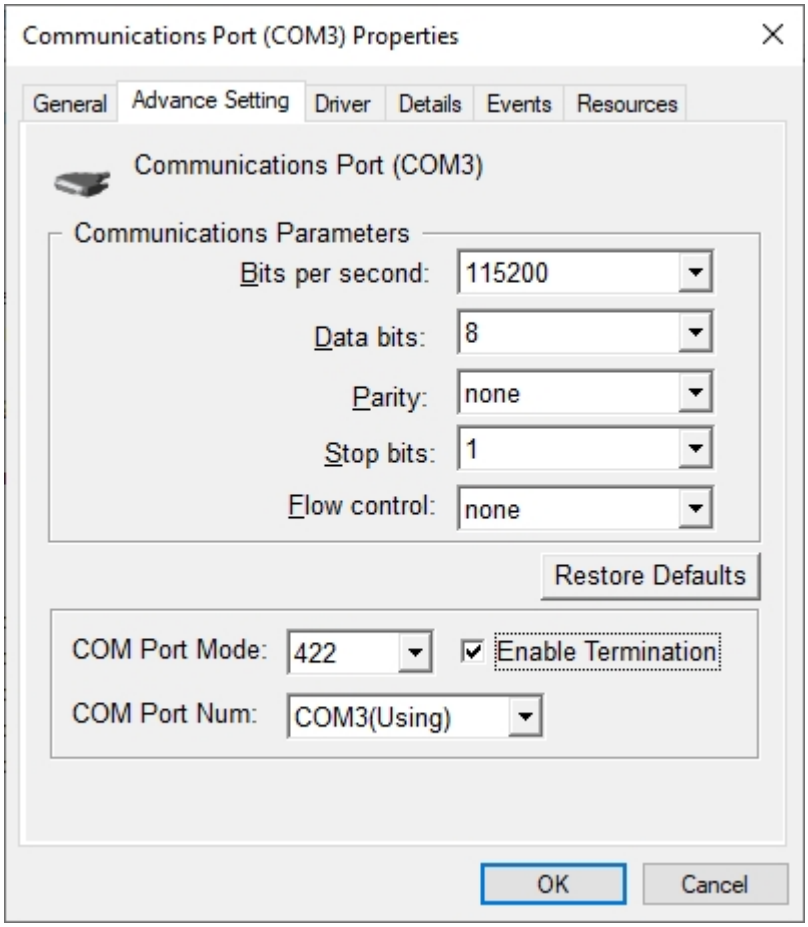
In Device Manager, right click the mouse to enter “properties” in ***“Communications ports”***.



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1.4. RS422/485 module switch mode

This section is applicable to following products.

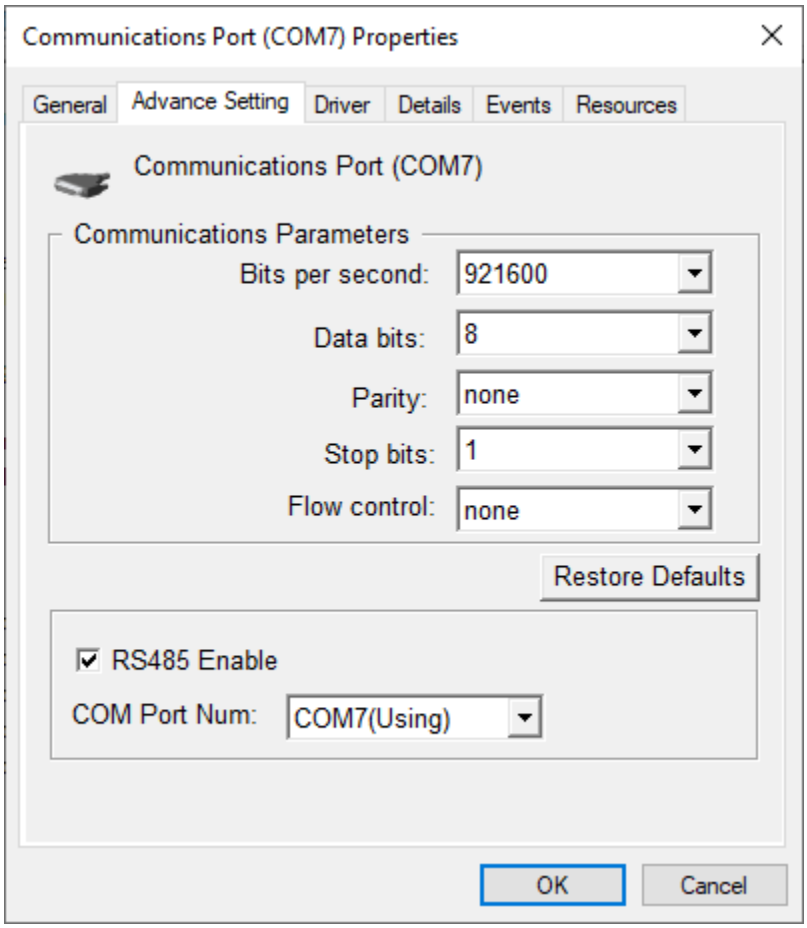
Product No.	RS232	RS485	RS422	Switch Method
EGP2-X4S1	X	O	O	Hardware

- RS422

After setting the DIP switch, it can be used directly.

- RS485

After setting the DIP switch, also need to check the "RS485 Enable" option.



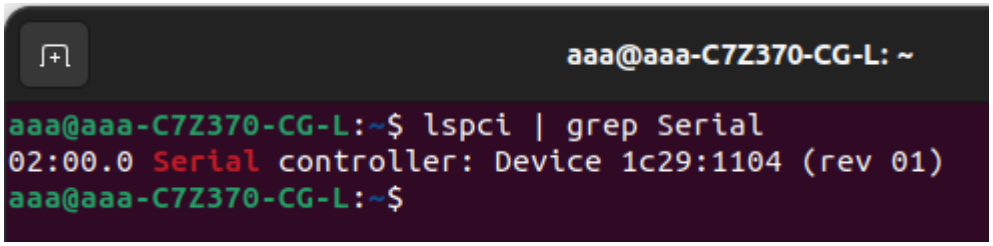
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2. Linux

Here we use Ubuntu 22.04 for example.

2.1. lspci

Check if the device exists in the system.



2.2. dmesg |grep tty

Shows how many Fintek serial ports are in the system, in this case ttyS4 to ttyS7.

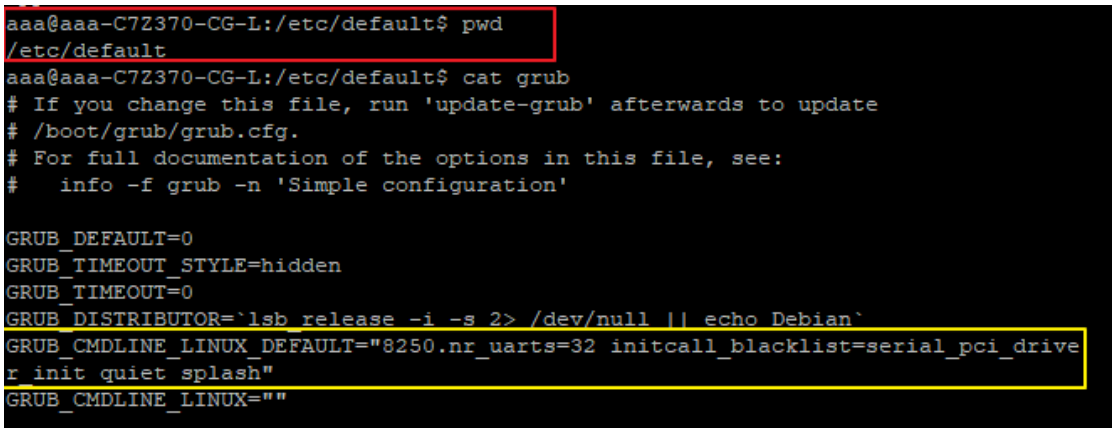


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2.3. Boot Config

1. Prepare tools:
   - Ubuntu
     $ sudo apt-get update
     $ sudo apt-get dist-upgrade
     $ sudo reboot
     $ sudo apt-get install gcc make kernel-package

2. Boot Configuration:
   - Ubuntu
     $ sudo nano /etc/default/grub
     add "8250.nr_uarts=32 initcall_blacklist=serial_pci_driver_init" to "GRUB_CMDLINE_LINUX_DEFAULT"
     $ sudo update-grub
     $ sudo reboot

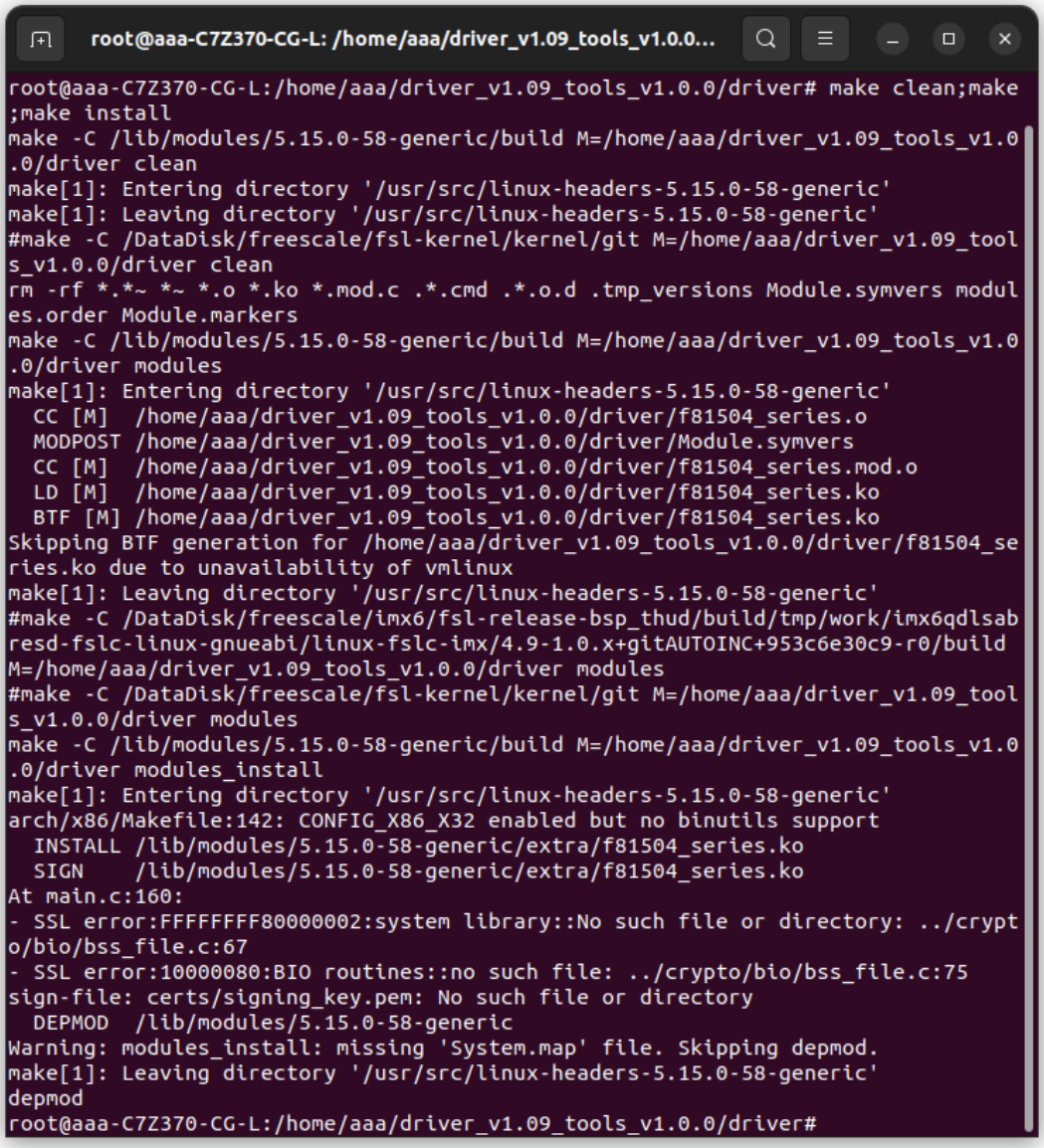


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2.4. Install Driver

This section is applicable to ALL products.

Step1. Go to driver folder.
Step2. Type command “#make”.
Step3. Type command “#make install”
Step4. Type command “#reboot”



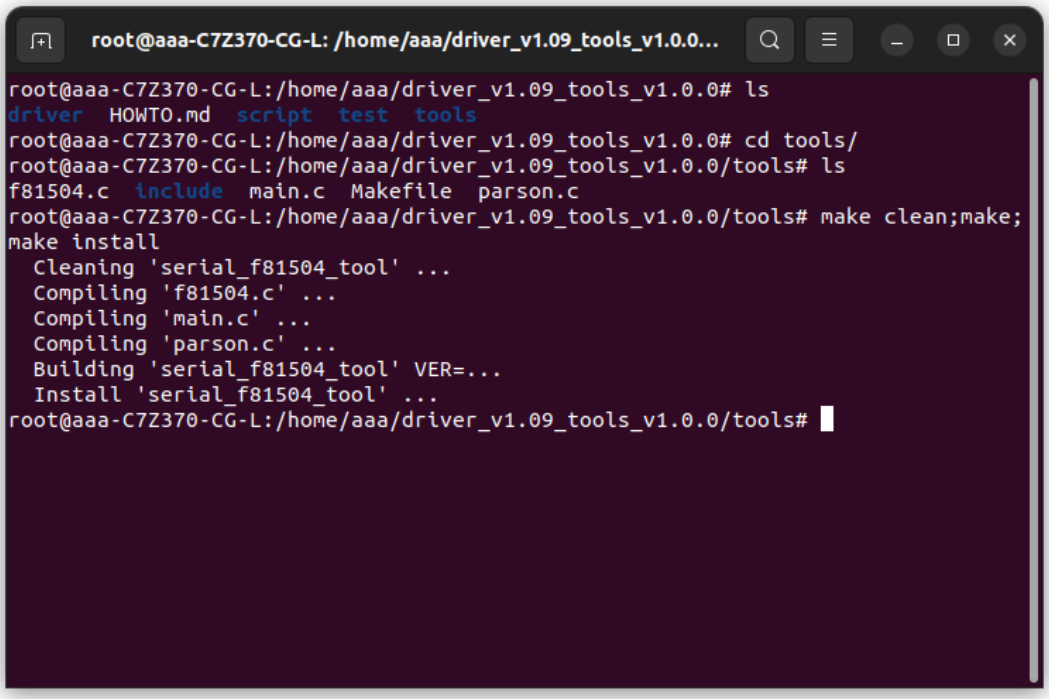
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2.5. Install Mode-Control Tool “serial_f81504_tool”

This section is applicable to following products.

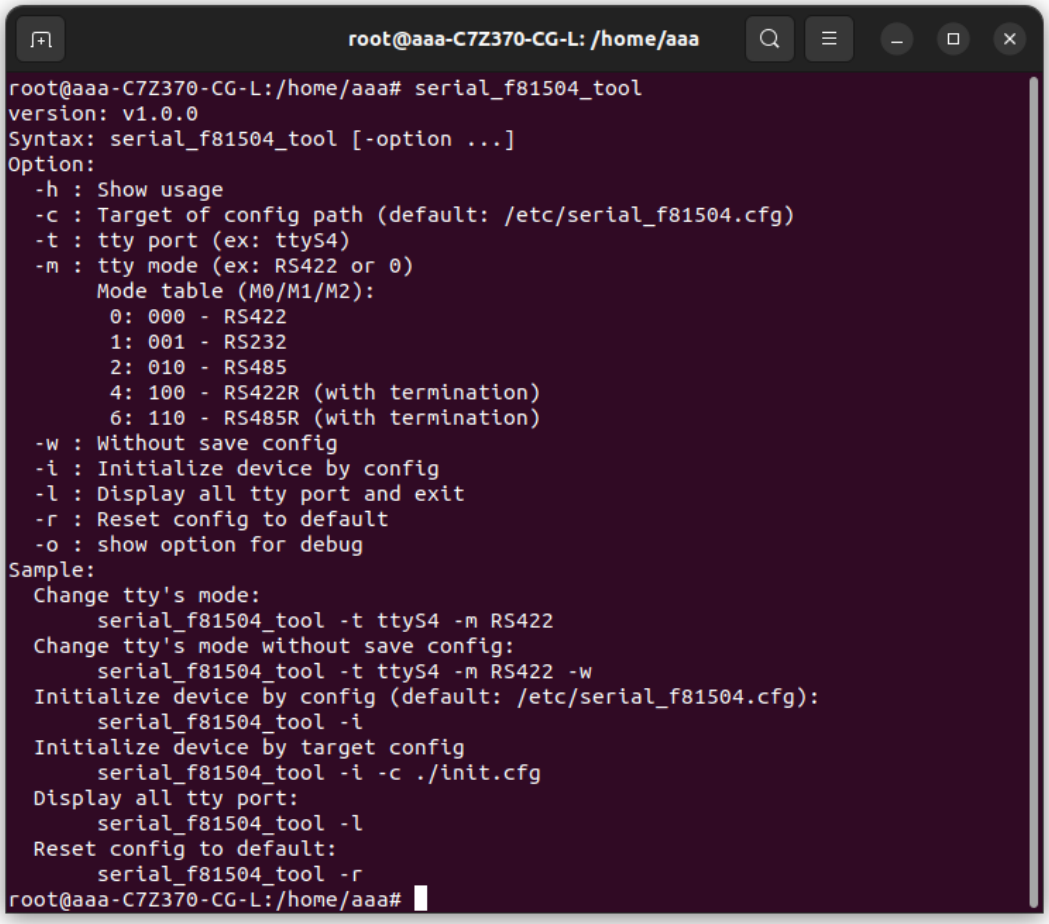
Product No.	RS232	RS485	RS422	Switch Method
EMP2-X206	O	O	O	Software
EMP2-X406	O	O	O	Software
EGP2-X204	O	O	O	Software
EGP2-X404	O	O	O	Software
EGP2-X4S1	X	O	O	Hardware

Step1. Go to tools folder.
Step2. Type command “#make”.
Step3. Type command “#make install”
Step4. Type command “#reboot”



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2.6. serial_f81504_tool README



2.7. Fix mode module

Can use directly after installing driver.

Product No.	RS232	RS485	RS422	Switch Method
EMP2-X207	O	X	X	Fixed Mode
EMP2-X407	O	X	X	Fixed Mode
EGP2-X203	O	X	X	Fixed Mode
EGP2-X403	O	X	X	Fixed Mode

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2.8. Switch Mode by Software

This section is applicable to following products.

Product No.	RS232	RS485	RS422	Switch Method
EMP2-X206	O	O	O	Software
EMP2-X406	O	O	O	Software
EGP2-X204	O	O	O	Software
EGP2-X404	O	O	O	Software

After installing driver and control tools, you can simply execute below command to initial the COM ports.

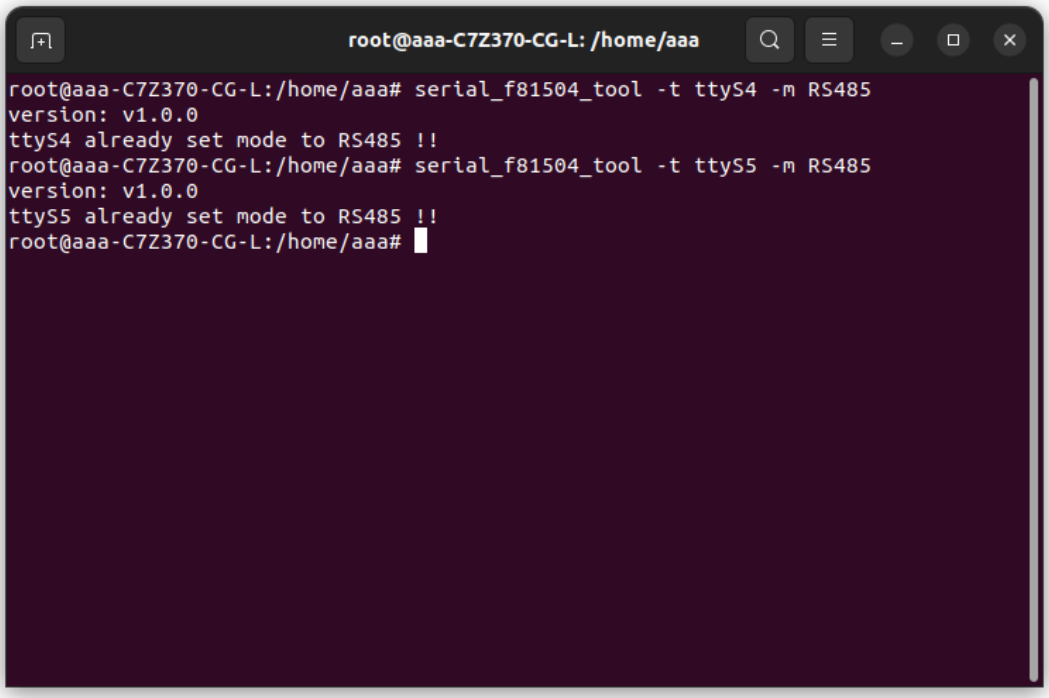
Notice, all serial_f81504_tool control tools need to be executed as root.

- COMMAND: serial_f81504_tool -i
  The serial_f81504_tool -i will help you check if the driver has been loaded on the system and setup all ports following the configuration file (/etc/serial_f81504.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.

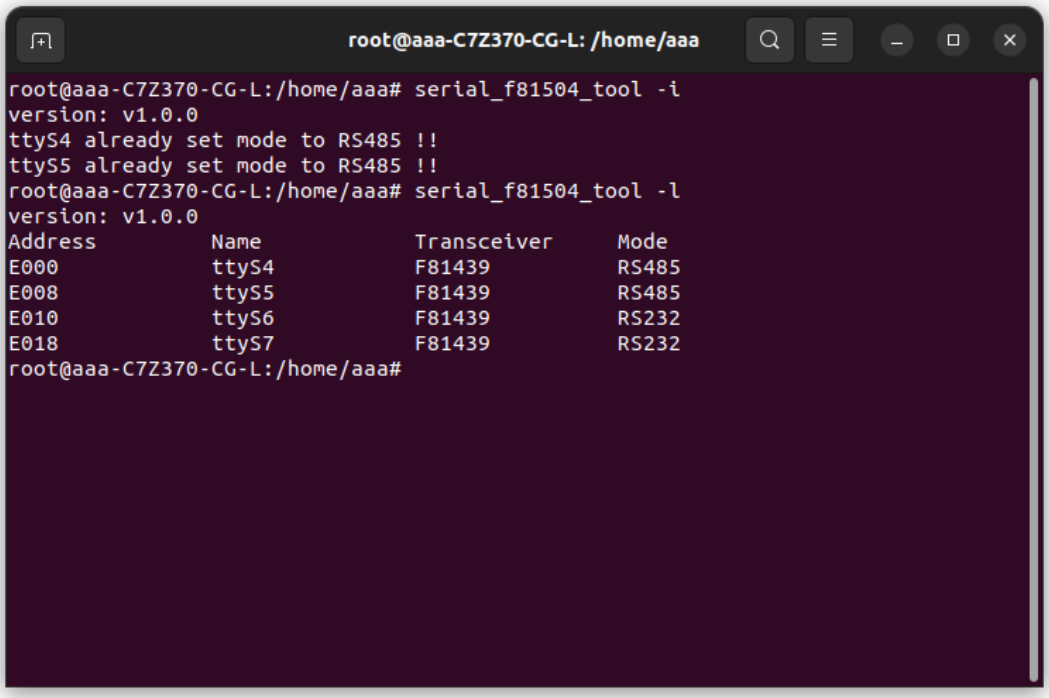
  Notice that, the serial_f81504_tool -i must be executed after system boot up every time to make sure the driver loaded well and all ports be configured as you want.

- COMMAND: serial_f81504_tool -t <port> -m <mode>
  The <port> specify which port you want to configure, And the <mode> specify the target mode, Mode table (M0/M1/M2):
  0: 000 - **RS422**
  1: 001 - **RS232**
  2: 010 - **RS485**
  4: 100 - **RS422R** (with termination)
  6: 110 - **RS485R** (with termination)

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- COMMAND: serial_f81504_tool –l
  You can check currently setting



- COMMAND: serial_f81504_tool –r (need reboot system after setting)
  Reset all port to default mode RS232.

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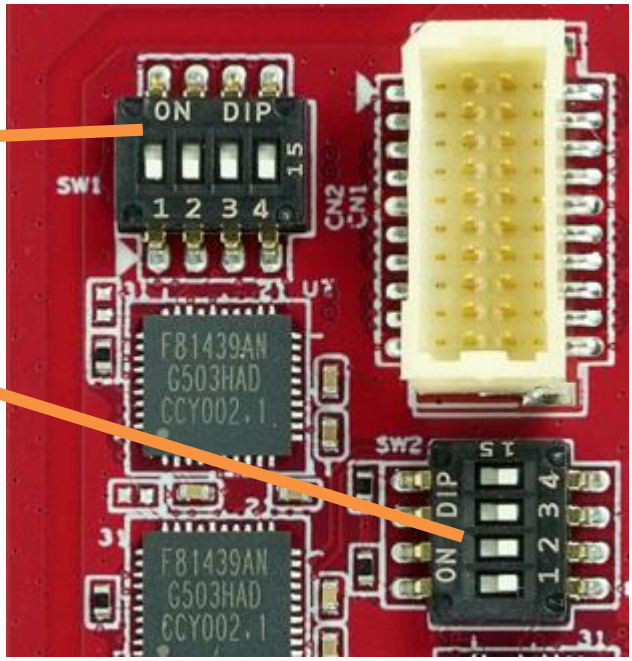
2.9. RS422/485 module switch mode

This section is applicable to following products.

Product No.	RS232	RS485	RS422	Switch Method
EGP2-X4S1	X	O	O	Hardware

SW1	
ON	TERMINATION
OFF	NON-TERMINATION

SW2	
ON	RS485 HD
OFF	RS422 FD



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2.10. Boot Up Script

We provide Linux boot up script to initial serial interface automatically after system boot up.

Run the following command in the “release” folder to add boot up script.

- $ chmod +x add_2_boot.sh
- $ ./add_2_boot.sh

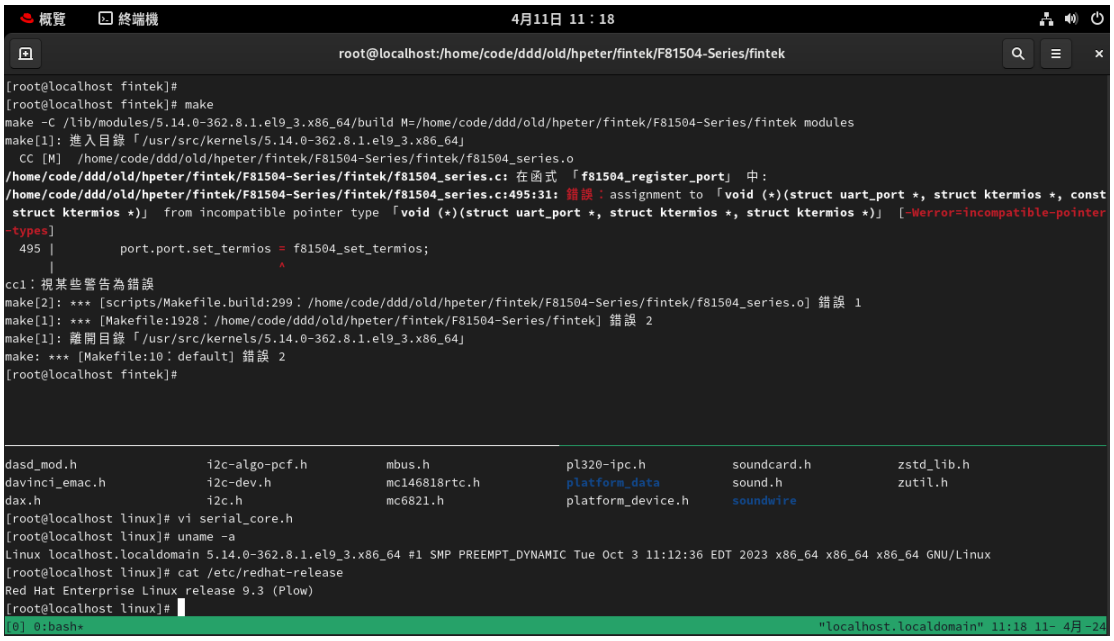
Run the following command in the “release” folder to remove boot up script.

- $ chmod +x remove_boot.sh
- $ ./ remove_boot.sh

2.11. FAQ

2.11.1. For RHEL kernel 5.14

F81504 will build failed on RHEL kernel 5.14.



It’s due to the RHEL kernel API not the same with mainstream’s. Customer must modify f81504_serial.c near line 290, change the #if 1 to #if 0 and re-build driver.

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```
284:#if LINUX_VERSION_CODE >= KERNEL_VERSION(2, 6, 36)
285:#if LINUX_VERSION_CODE >= KERNEL_VERSION(6, 1, 0)
286: void f81504_set_termios(struct uart_port *port, struct ktermios *termios,
287:                         const struct ktermios *old)
288:#else
289:#if 1
290: void f81504_set_termios(struct uart_port *port, struct ktermios *termios,
291:                         struct ktermios *old)
292:#else
293: // for centos stream kernel 5.14.0-390-el9
294: void f81504_set_termios(struct uart_port *port, struct ktermios *termios,
295:                         const struct ktermios *old)
296: #endif
297: #endif
298: {
299:         struct pci_dev *dev = container_of(port->dev, struct pci_dev, dev);
300:         struct f81504_priv *priv = pci_get_drvdata(dev);
301:         unsigned int baud = tty_termios_baud_rate(termios);
```