MotionRT750 User Manual

V1.0.0

SHENZHEN ZMOTION TECHNOLOGY CO., LTD

Chapter I MotionRT Introduction

MotionRT is a real-time environment for Zmotion motion, and it's currently developed up to the Generation 7.

MotionRT	Specification	Related Controller / Card
MotionRT1	Real time motion (RtMotion) Real time BASIC(RtBasic)	ZMC0XX; ZMC1XX ECI1000 / ECI2000 / ECI3000
MotionRT2	Real time motion (RtMotion) Real time BASIC(RtBasic) Real time Plc (RtPlc)	ZMC2XX;
MotionRT3	Real time motion (RtMotion) Real time BASIC(RtBasic) Real time Plc (RtPlc) Real time Hmi (RtHmi)	ZMC3XX; XPLC
MotionRT4	Real time motion (RtMotion) Real time BASIC(RtBasic) Real time Plc (RtPlc) Real time Hmi (RtHmi) Real time bus (EtherCAT, RTEX, XY2-100)	ZMC4XX
MotionRT5	Real time motion (RtMotion) Real time BASIC(RtBasic) Real time Plc (RtPlc) Real time Hmi (RtHmi) Real time bus (EtherCAT, XY2-100) Machine vision (ZVision) Real time Linux (ARM) Rapid LOCAL connection	VPLC5 Series
MotionRT6	Real time motion (RtMotion) Real time BASIC(RtBasic) Real time Plc (RtPlc) Real time Hmi (RtHmi) Real time bus (EtherCAT, XY2-100) Machine vision (ZVision) Real time Linux (X64) Rapid LOCAL connection	VPLC5 Series
MotionRT7	Real time motion (RtMotion) Real time BASIC(RtBasic) Real time Plc (RtPlc) Real time Hmi (RtHmi) Real time bus (EtherCAT, XY2-100) Machine vision (ZVision) Real time Windows (X86) Rapid LOCAL connection	VPLC7 Series, normal PC / IPC

Chapter 2 IPC Operation Requirements

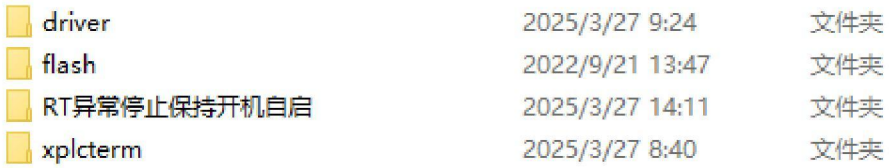
Item	Specification	Details
Operation System	Windows	/
CPU	≥4 Cores	Only “intel” type is supported; AMD is invalid.
Base Frequency	>2GHZ	/
Hard Disk	≥128G	/
Memory	≥8G	/

Note: please use the PC/IPC that supports good real-time performance.

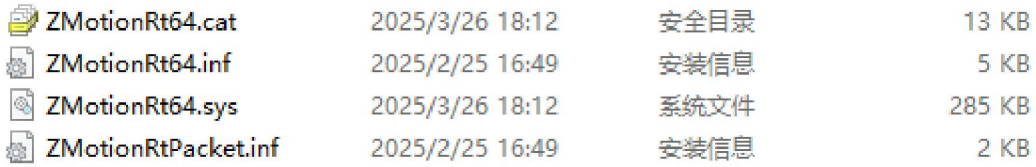
Chapter 3 MotionRT Usage Steps

MotionRT750 is used together with XPCI/XPCIE control cards, to play the best performance. This authorization information is stored inside the control card, which means each card has the unique No.

Before installment, please decompress the latest MotionRT7 file.



1.Driver: the driver folder, which includes MotionRT7 drive installment information file, ECAT protocol installment information, setup wizard file, security catalog file, system file, and signature file.



ZMotionRT64.cat: the drive digital signature file;

ZMotionRT64.inf: MotionRT7 software drive installment information, choosing the file while installing the driver;

ZMotionRT64.sys: system file;

ZMotionRTPacket.inf: EtherCAT protocol installment information, choosing this file while installing the ECAT bus protocol.

2. **Flash:** the controller system folder.

3. **Xplcterm:** xplc screen folder, including xplcterm software, it is used as the screen when using HMI.

3.1 BIOS Configurations

Before installing the driver, please do BIOS configurations at first.

1. Enter BIOS: after the computer shuts down, press the power button, and repeatedly tap the shortcut key as soon as the screen lights up.

2. After that, please configure the blow parameters **(it must be done for MotionRT750)**:

✅Hyper Threading -----Disable

✅Intel Virtualization Technology（VT x ） -----Disable

✅c states -----Disable

✅Turbo mode ----enable

Regarding on the above configurations, please confirm that from your computer manufacturers. Generally, it is in the BIOS CPU Configuration.

Note: On some CPUs equipped with the efficiency cross (E-cores), the E-cores need to be disabled. Enter the BIOS, navigate to CPU settings, and set the number of active E-cores to 0.

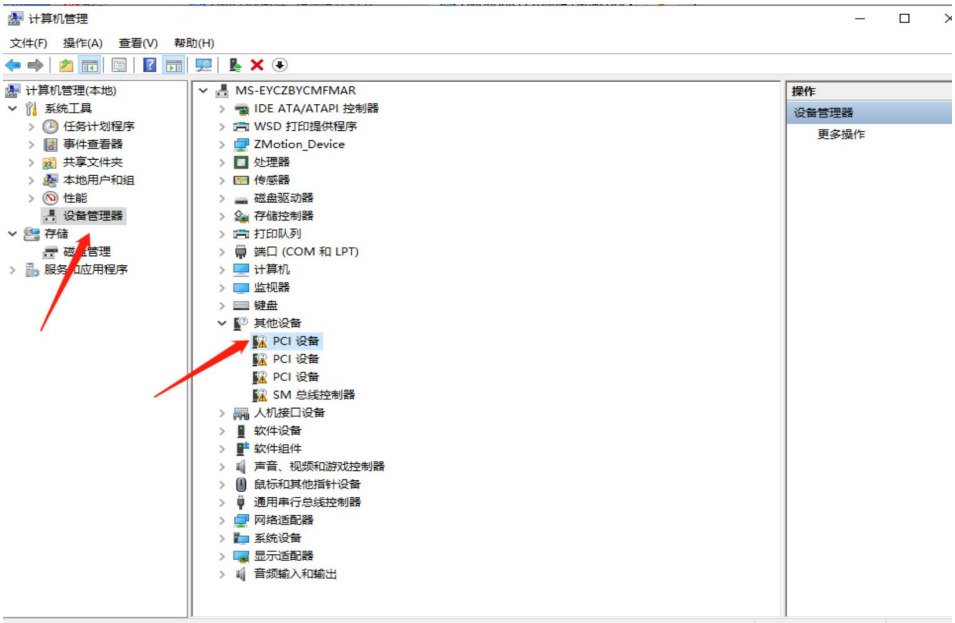
If the real time performance fails to meet your requirements, you may configure the following parameters (optional settings). There is no fixed location for these options. It is recommended to contact the manufacturers.

- ✧ intel(R) speedstep ----Disable
- ✧ intel speed shift technology ----Disable
- ✧ Maximum GT frequency------>300Mhz
- ✧ Tcc mode ----->Enable
- ✧ DMI Link ASPM Control ---->Disable
- ✧ ACPI Sleep State -----> Suspend Disabled
- ✧ PCH Cross Throttling ---->Disable
- ✧ Aggressive LPM Support ---->Disable
- ✧ Intel(R) TCC Authentication --->Disable

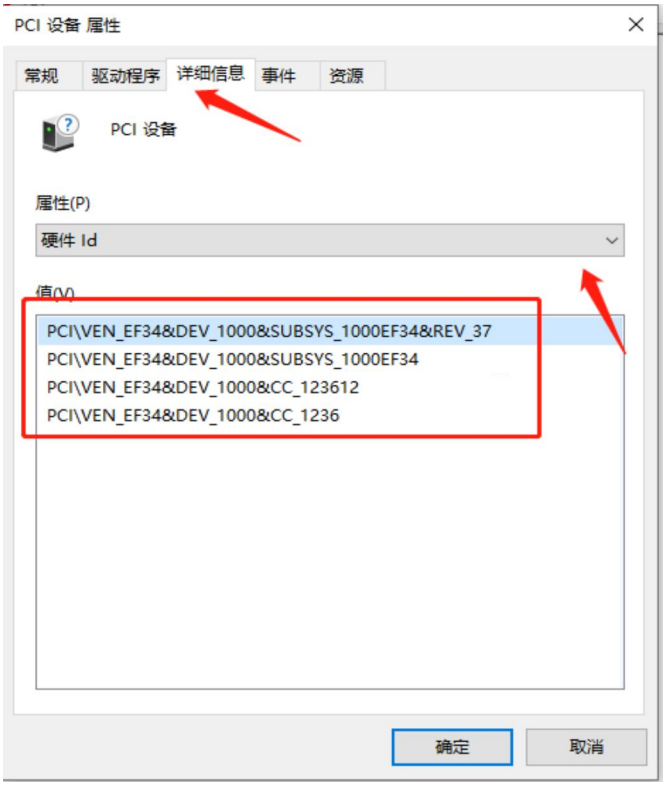
- ✧ Dvmt pre-allocated ----->64m
- ✧ IO Fabric Low Latency ---->Enable
- ✧ ACPI D3Cold Support ----> disable
- ✧ Low Power SO Idle Capability ---->disable
- ✧ SA GV ---->disable
- ✧ Page Close Idle Timeout ----->disable
- ✧ Power Down Mode ---->disable
- ✧ RC6 (Render Standby) ---->disable
- ✧ L1 Substates----> disable
- ✧ ASPM ----> disable
- ✧ PCl Express Clock Gating---->disable
- ✧ Intel(R) Turbo Boost Max Technology 3.0-----disable

3.2 How To Install the Driver?

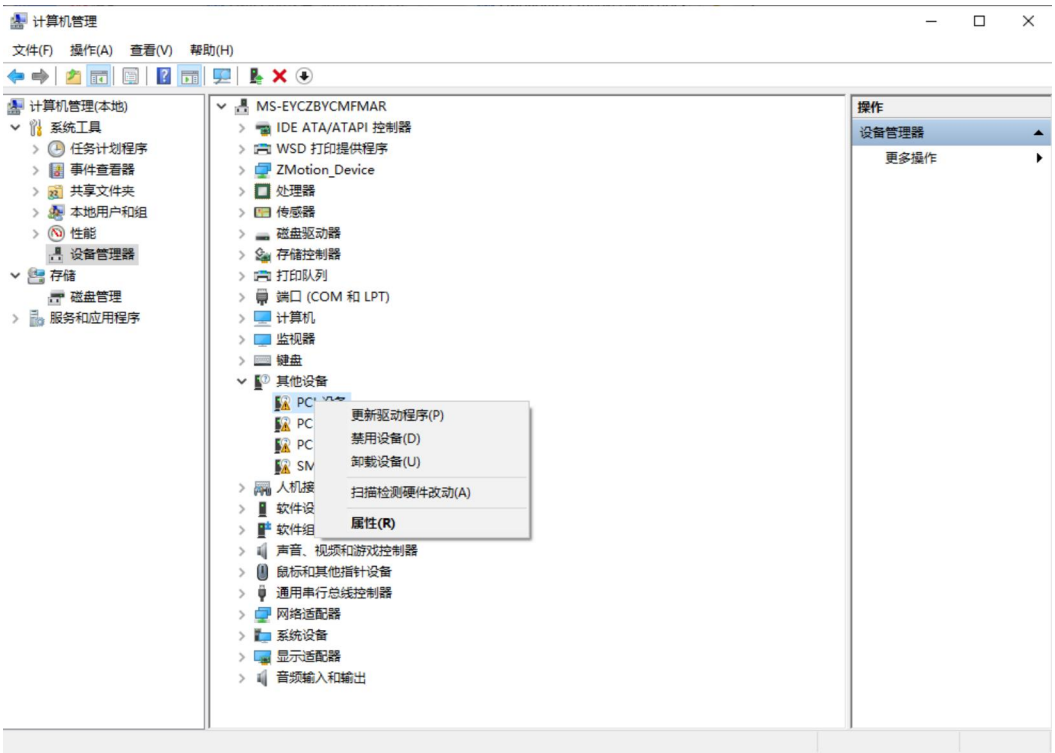
1. Open the Device Manager menu and select the PCI device under "Other devices."



2. If multiple PCI devices are present, right-click and select "Properties" to view detailed information; then, under the "Property" dropdown, select "Hardware IDs" and identify the device that begins with "PCI\VEN_EF34&DEV_1000&".



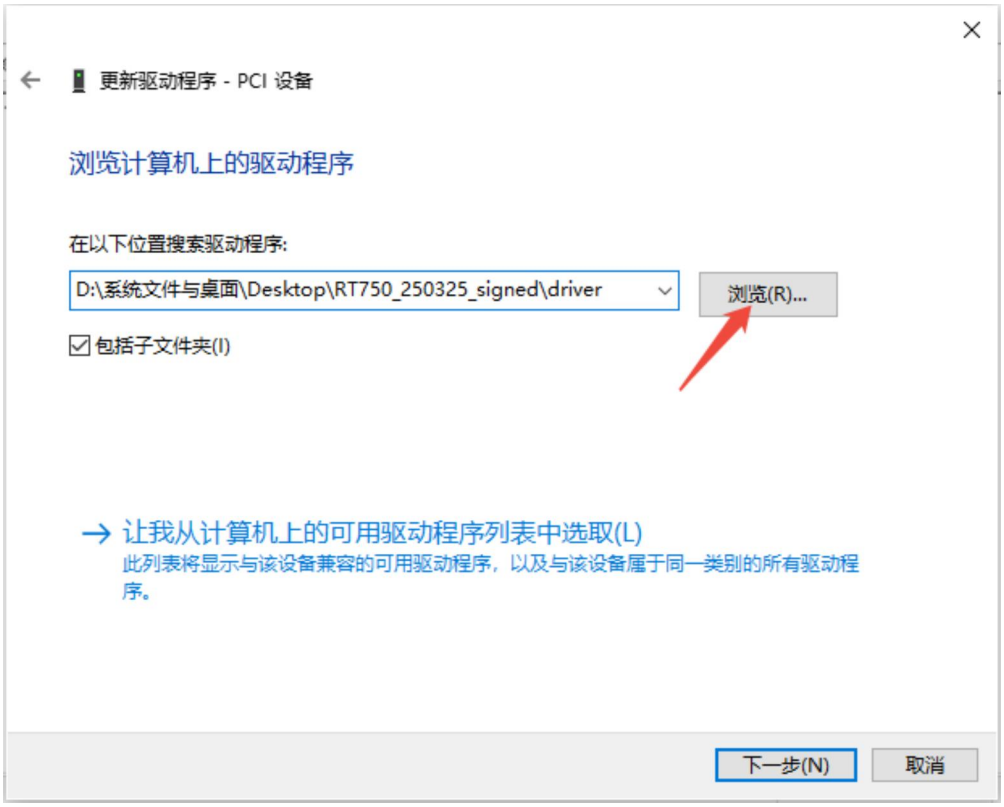
3. Locate the PCI device, right-click it, and select "Update driver."



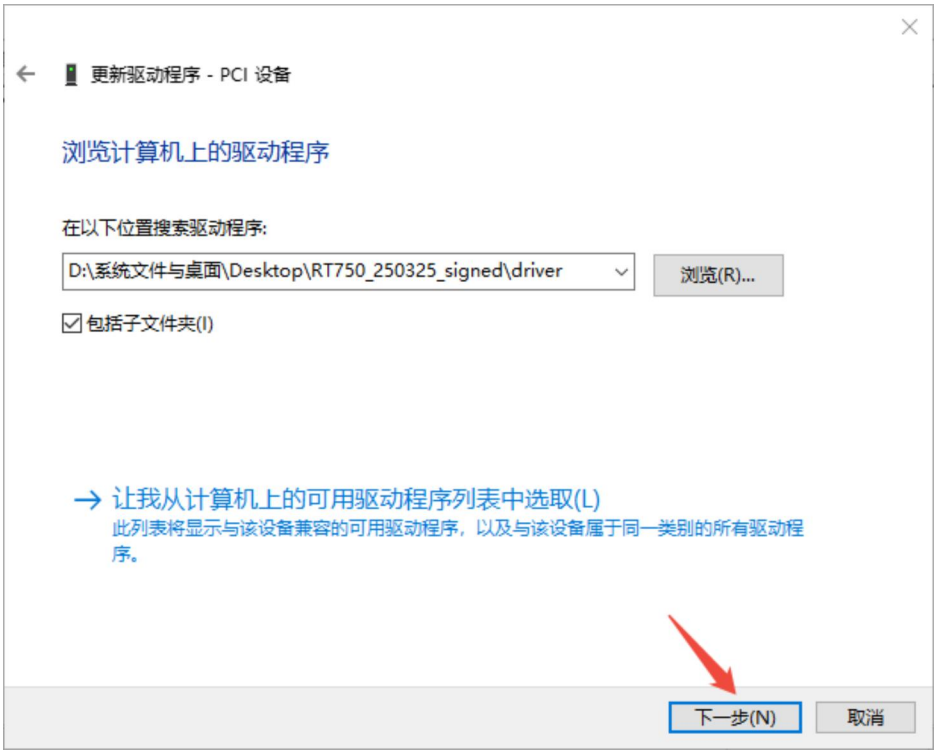
4. Select "Browse my computer for drivers."



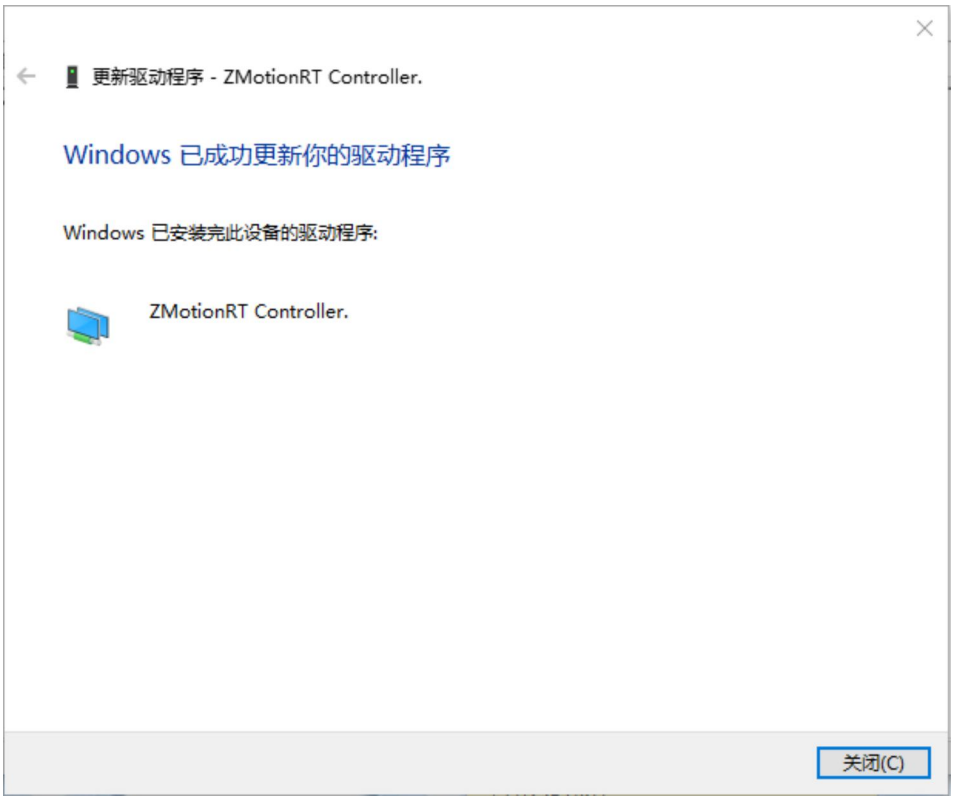
5. Click to browse and select the "driver" folder for the RT750.



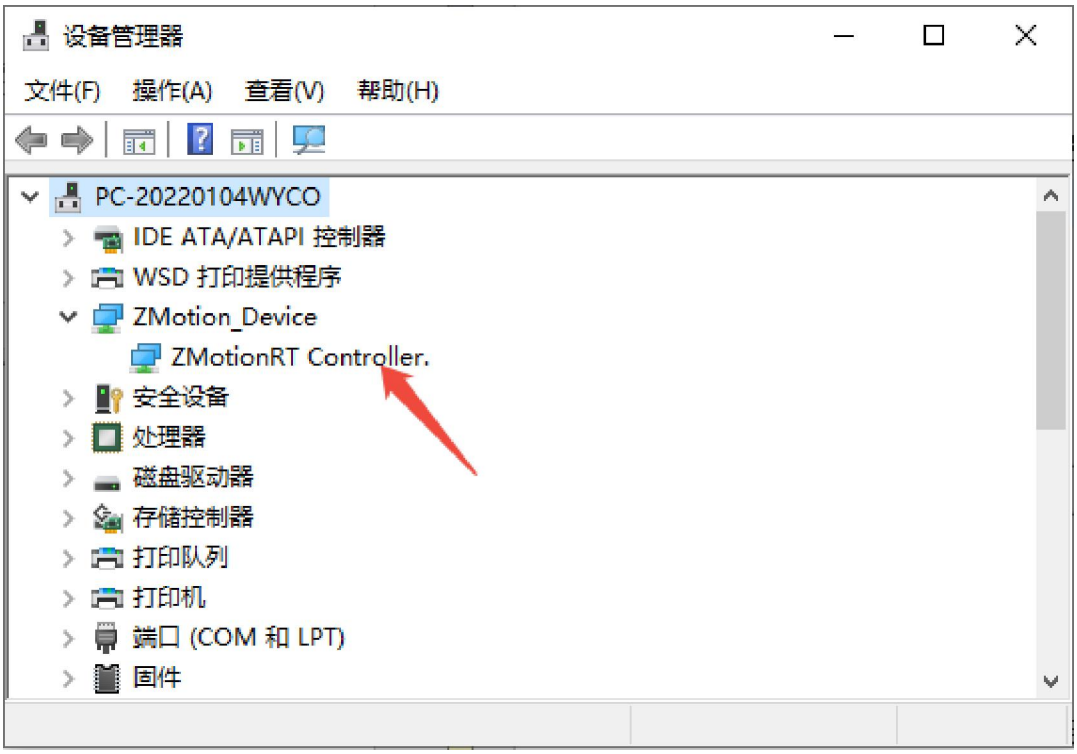
6. Click Next.



7. Wait for the installation to complete, then click Close.



8. If "ZMotionRT Controller" appears in Device Manager, the installation was successful.



3.3 How to Configure MotionRT750 CPU

Right-click `configtool.exe` (included in the MotionRT750 installation package) and select "Run as administrator" to access the CPU configuration. The "reserve" value is typically set to 1 by default; there is no need to change it—simply click "Config" to confirm the settings. The CPU configuration should be left at its default values; no changes are required—just click "OK."

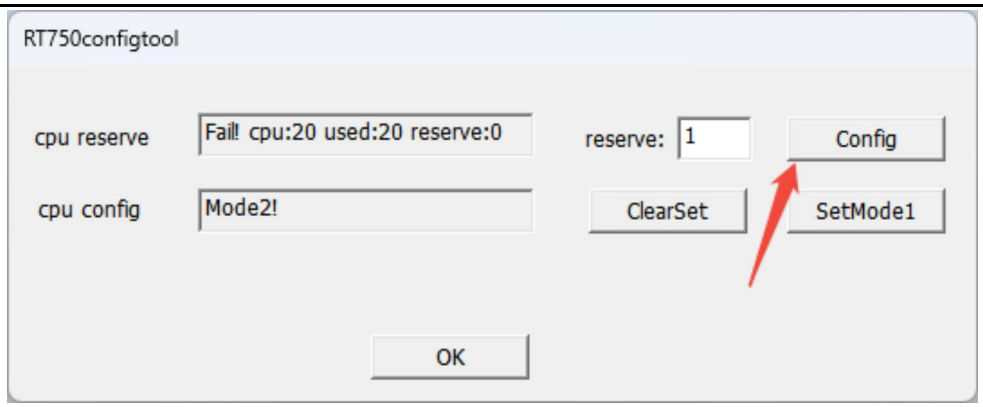
Notes:

The corresponding version of the driver must be installed before execution.

All console applications must be closed before execution.

Administrator privileges are required for execution.

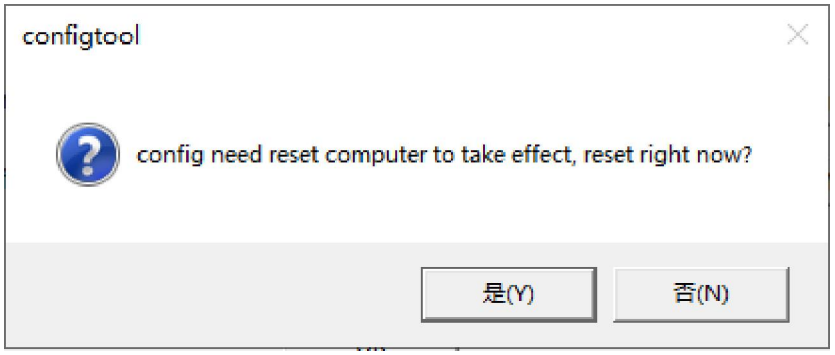
MotionRT750 cannot be used unless the CPU is configured; if you do not intend to use MotionRT750, set "reserve" to 0 in this interface, click "ClearSet" to remove the configuration, and then restart your computer.



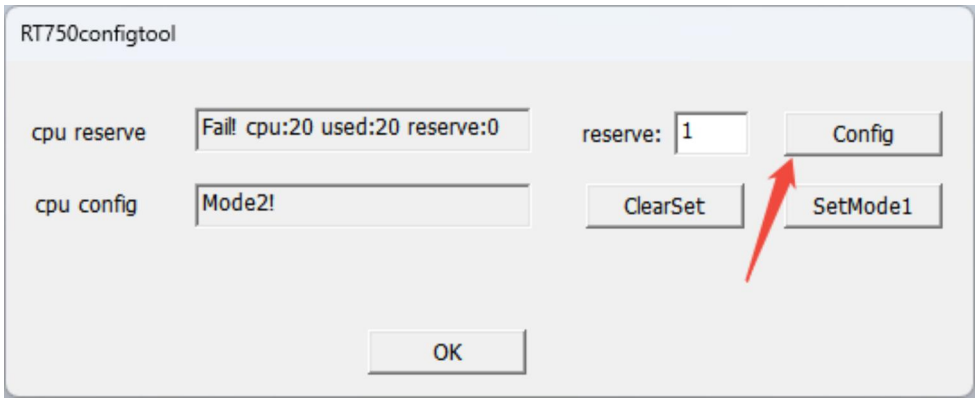
configtool (CPU unconfigured)

3. After clicking "OK," a window will appear; select "Yes" to restart your computer immediately. (Please note that some computers may not currently support this: if, after restarting, the software causes the system to become unresponsive, freeze, or prevents other applications from functioning, then that computer is not currently compatible with MotionRT750; in such cases, please use MotionRT710 instead.)

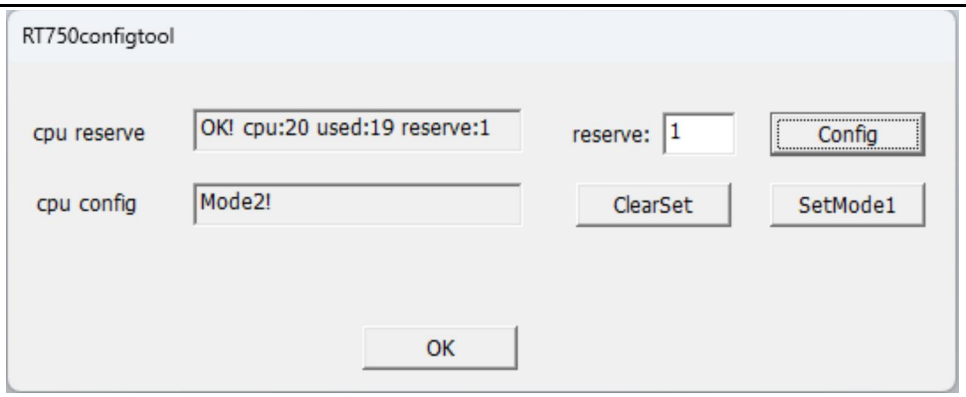
CPU configuration changes will only take effect after the computer has been restarted!



4. Please check the configtool again.



configtool (CPU unconfigured)



configtool (CPU configured)

5. RunMotionRT750.exe

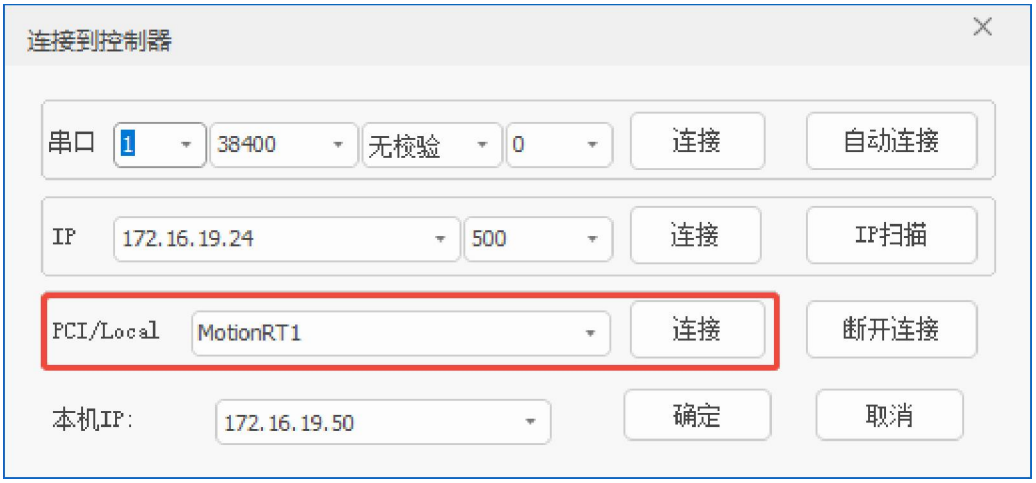
6. Set parameters if needed according to Chapter 4.

7. Start (If parameters updated, please stop at first, then start).

8. Open RTSys to connect to the card via LOCAL.

(1) Start RT console, click START.

(2) Open RTSys, choose LOCAL (MotionRT1) to connect to the card.

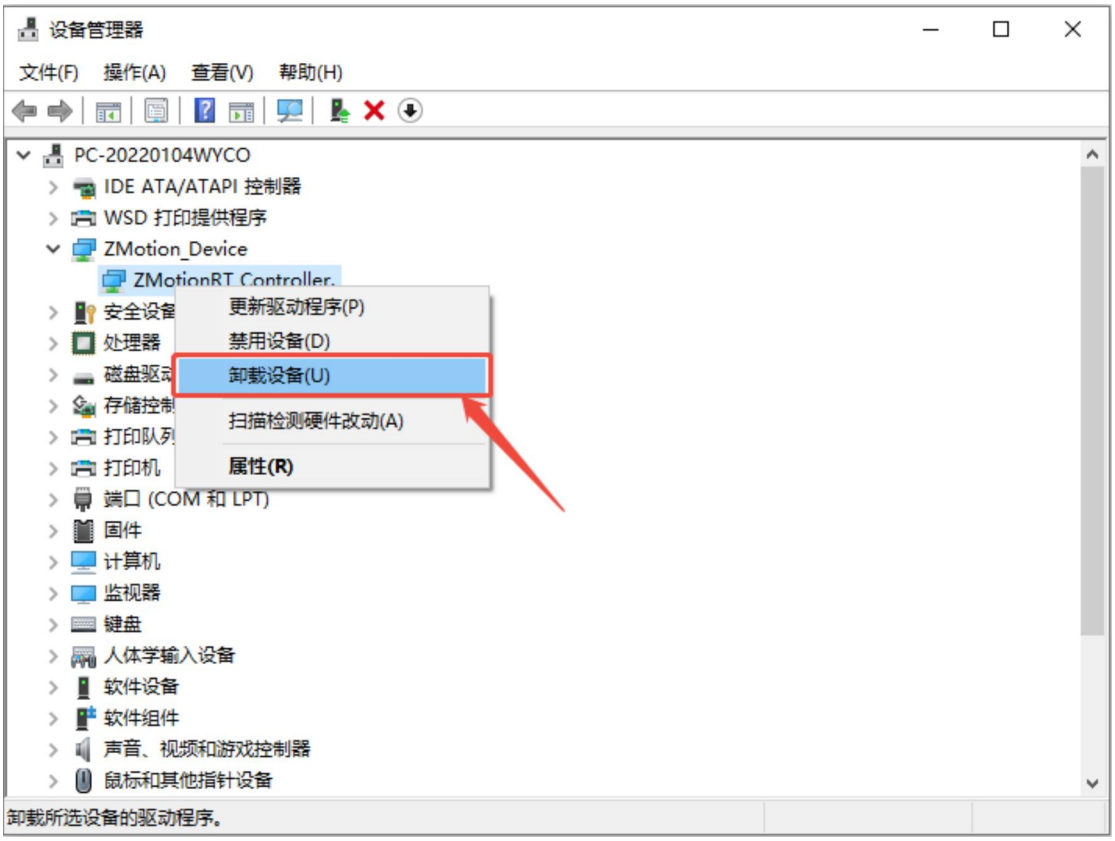


3.5 How to Uninstall the Driver (if needed)?

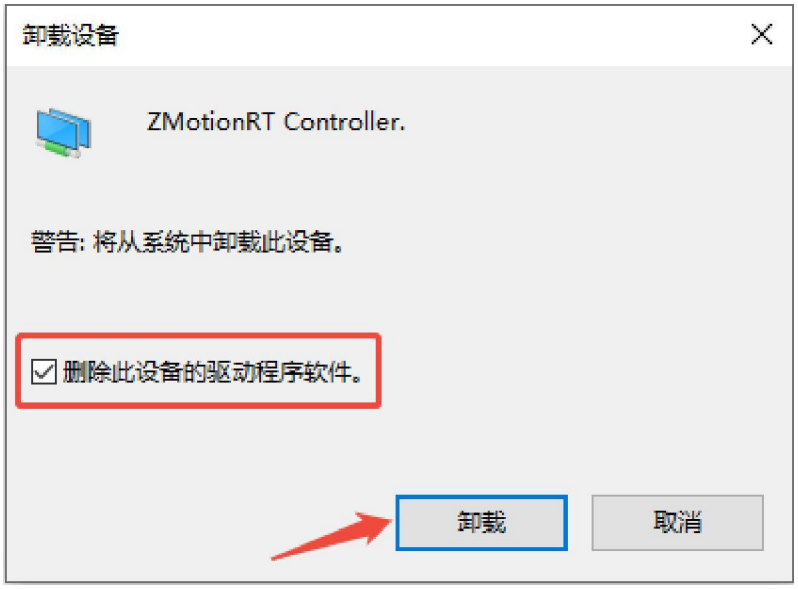
1. Under normal operating conditions, the MotionRT750 driver should not be uninstalled. This section applies only to scenarios where uninstallation and reinstallation are required.

2. Before uninstalling the driver, stop all MotionRT7 motion operations and close any running software applications.

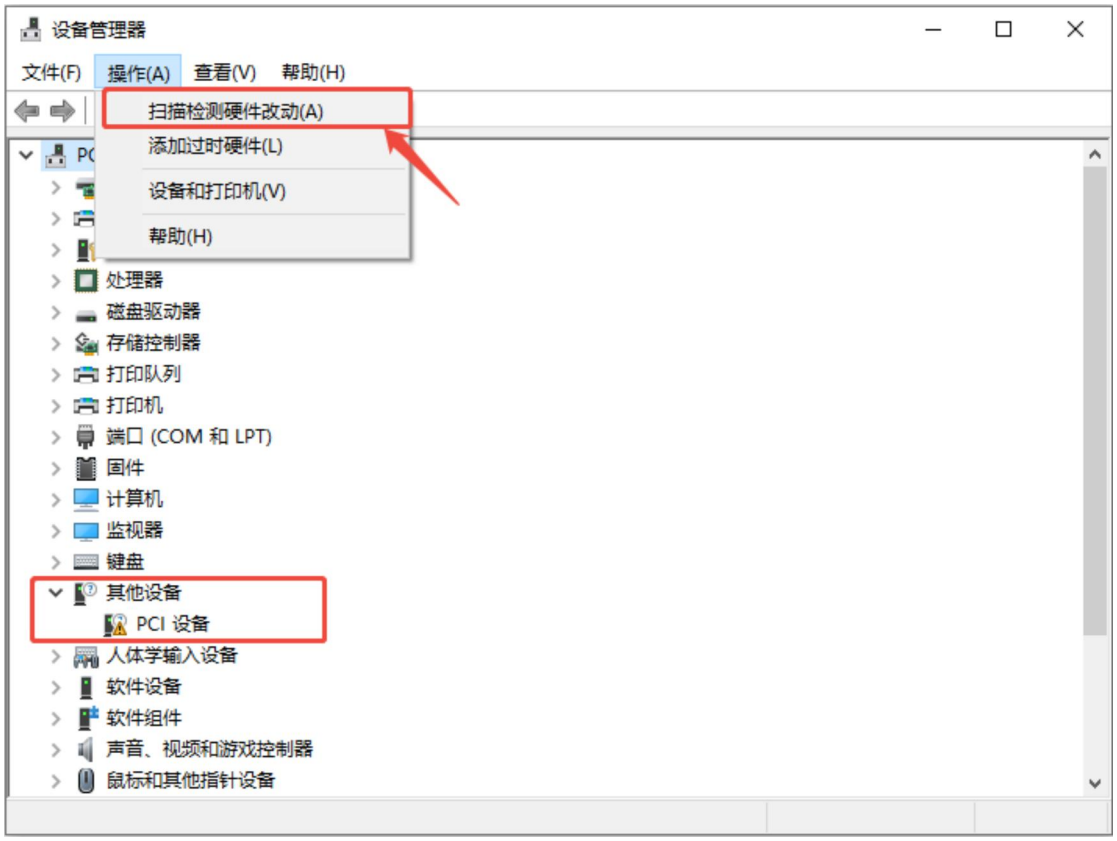
3. Locate the "zmotionRT controller" in Device Manager, right-click it, and select.



4. Check the box to delete the driver software for this device, then click Uninstall.



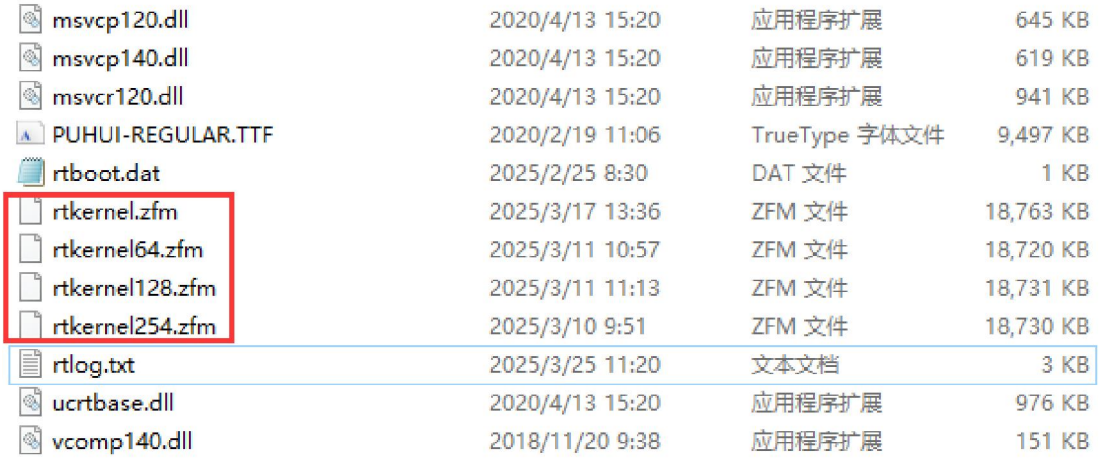
5. Click "Scan for hardware changes" under the "Action" menu; the PCI device will reappear, indicating that the driver has been successfully uninstalled.



3.5 How to Upgrade the Firmware?

Different numbers of axes require the use of different firmware versions!

To upgrade the firmware for the MotionRT750, you must obtain the appropriate firmware file from the manufacturer and place it into the MotionRT750 installation directory.



Switch the firmware file under "Kernel file" in the Config interface, then click "OK".

Chapter 4 RT Console

To use MotionRT, you must first launch the RT Console; you can configure it to run automatically via the Config interface.

4.1 Configtool

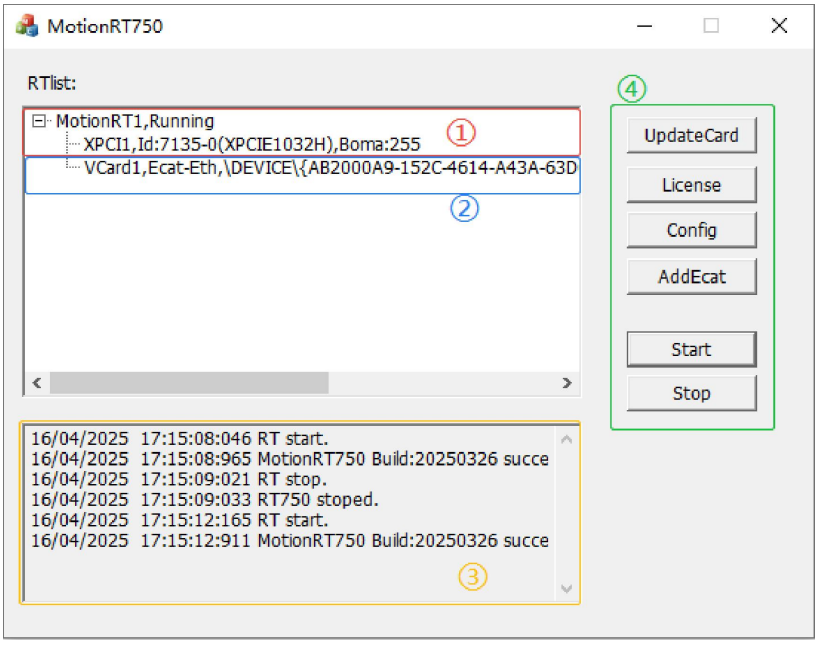
CPU Reserve: The default value is 1; no changes are required! ("cpu" refers to the total number of CPU cores on the computer, "used" refers to the number of cores utilized by the host, and "reserve" refers to the number of cores reserved for MotionRT.)

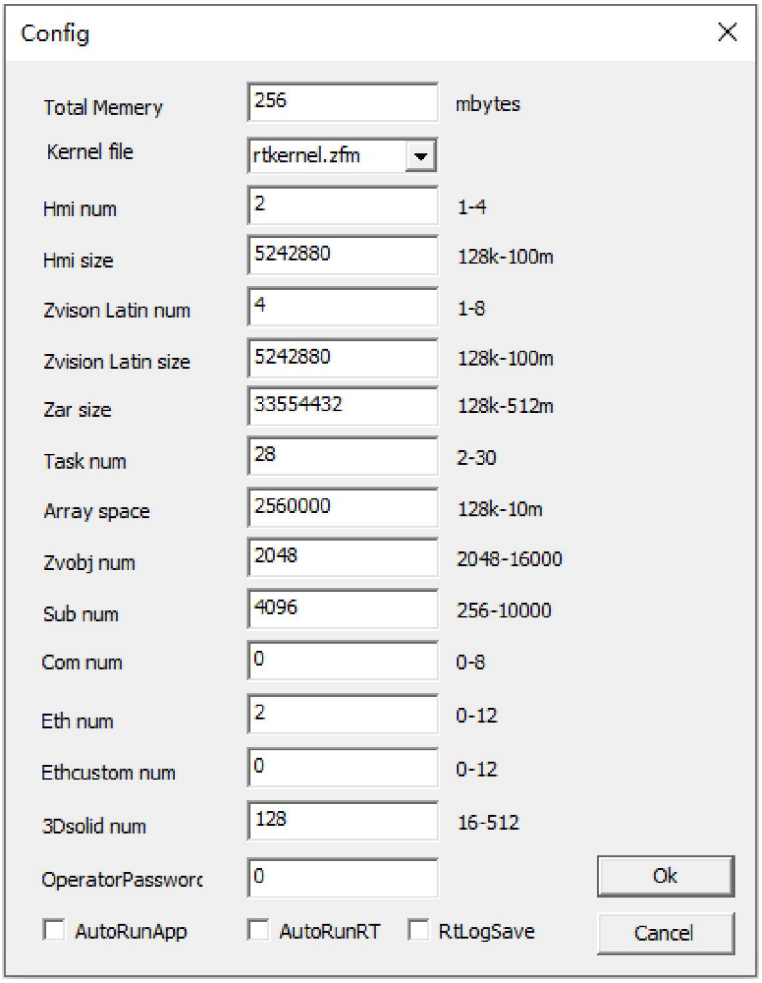
CPU Config: no need to configure.



3. Timing and records of operation and stoppage, as shown by ③ in the figure below.

4. Configuration of various functional parameters (Config)





Interface	Functions	Descriptions
License Parameters	Frame	R1: normal robot
	Robot	R6: Delta, 6 DOF, and other special structures.
	NcGcode	NC: G code, NC
	HW	HW: hardware comparison output, PSO.
	ZVision	ZV: Zmotion vision
	Fast	Fast version
	Motor	Real axes numbers, please set a bigger value than real usage. AX4: up to 4 AX6: up to 6 AX8: up to 8 AX16: up to 16 AX24: up to 24 AX32: up to 32 AX64: up to 64

	Motion	Supported functions: MO8: jog, electronic cam, linear interpolation, circular interpolation, continuous interpolation.
	License	Used to display & save License parameter configuration Window
Config Parameters	Total Memery	Total memory—which encompasses all data-storage space within the controller, such as array space, Zar file size, channel capacity, and HMI resolution—should ideally be set to a value of 200 or greater. (It is recommended to allocate at least 30% more capacity than what is actually required, while keeping the total memory within a limit of 1024.)
	Kernel file	Firmware file
	Hmi num	HMI numbers
	Hmi size	The resolution of one HMI
	Zvision Latin num	Vision channels numbers
	Zvision Latin size	The size of one vision channel
	Zar size	The size of Zar file
	Task num	Maximum number of executable tasks
	Array Space	Size of allocated array space
	Zvobj num	Number of `Zvobject` allowed
	Sub num	Maximum number of SUB functions
	Com num	Number of serial ports
	Eth num	Number of network ports (PORT): The configured value must be less than the maximum allowable limit. The sum of "Eth num" and "Ethcustom num" must not exceed the total number of network communication channels supported by the controller (up to a maximum of 12).
	Ethcustom num	Number of custom network communication channels
	3Dsolid num	Number of 3D solids
	Operator Password	Operation password (set to 0 for no password; must be numeric and no more than 10 digits long). If forgotten, the password can be viewed or modified in the configuration file.
	AutoRunApp	The software launches automatically upon system startup. (Be sure to uncheck the relevant option before uninstalling or reinstalling the RT software; otherwise, it may cause the software to behave abnormally or open multiple instances.)
	AutoRunRT	The RT launches automatically upon system startup. (Be sure to uncheck the relevant option before uninstalling or reinstalling the

Start & Stop		RT software; otherwise, it may cause the software to behave abnormally or open multiple instances.)
	RtLogSave	Save the log into the log file
	Start	Start the RT software; the RT is then in a running state.
	Stop	Stop the RT software; the RT is then in a shut-down state.
Note: The temporary license is valid for 3 hours; if it expires, simply restart the RT. The 7-series does not support power-loss interrupts, but it does support saving data to non-volatile RAM (VR) upon power loss.		

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