neXCOBOT

NexCOBOT Co., Ltd.
NexRTOS
User Manual

CONTENTS

PREFACE

Disclaimer

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Acknowledgements

NexRTOS is a trademark of NexCOBOT Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Revision History

| Version	Date	Description
v1.00	November 2021	Initial release

CHAPTER 1: NEXRTOS INTRODUCTION

1. Introduction

NexRTOS is the uSec & multi CPU-isolated Real-time OS Solution. It is designed for complex machinery that perform the high-precise motion control, computer vision and critical applications, such as: Machinery Controller, CNC Controller, Industrial Robots, Embedded Equipment and others.
The NexRTOS Solution Kits include a 4 cores platform with CPU isolation designed for a Custom Real-time Controller, running HMI in Processor 0 and other real-time controls in the other 3 processors.

NexRTOS is an X86 Real-time OS Solution Kit that offer the precise timer and jitter for controlling EtherCAT-based
• Servo drive/motor
• Distributed I/O
• Slave Device
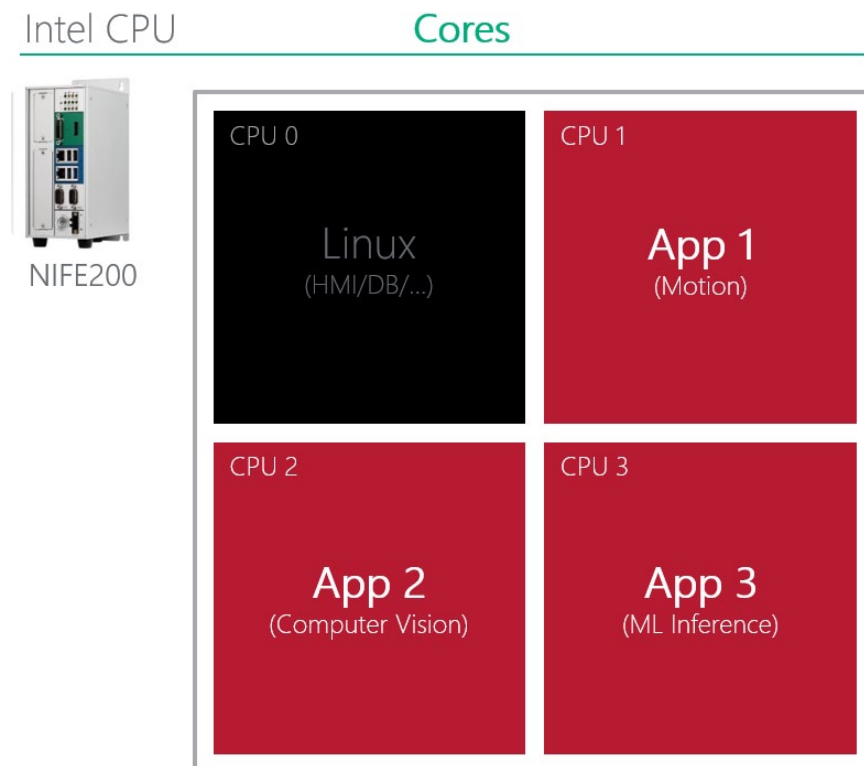
1.1 NexRTOS Features

1.1.1 NexRTOS can guarantee precision to the following:
- Timer periods 1 ms
- Jitter cyclictest < 40 us
- IST latencies <30 us
- Latency in 30 us

1.1.2 NexRTOS can do CPU Isolation, examples include:
- Linux kernel and Desktop in processor: 0
- Individual tasks on independent processors

1.1.3 IGH EtherCAT Sample Code
- HMI application
- Motor & I/O application
- EtherCAT master application

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1.2 NexRTOS Software Building Blocks

NexRTOS is a Linux Real-time OS, it based on a custom Linux with modified Kernel and driver.
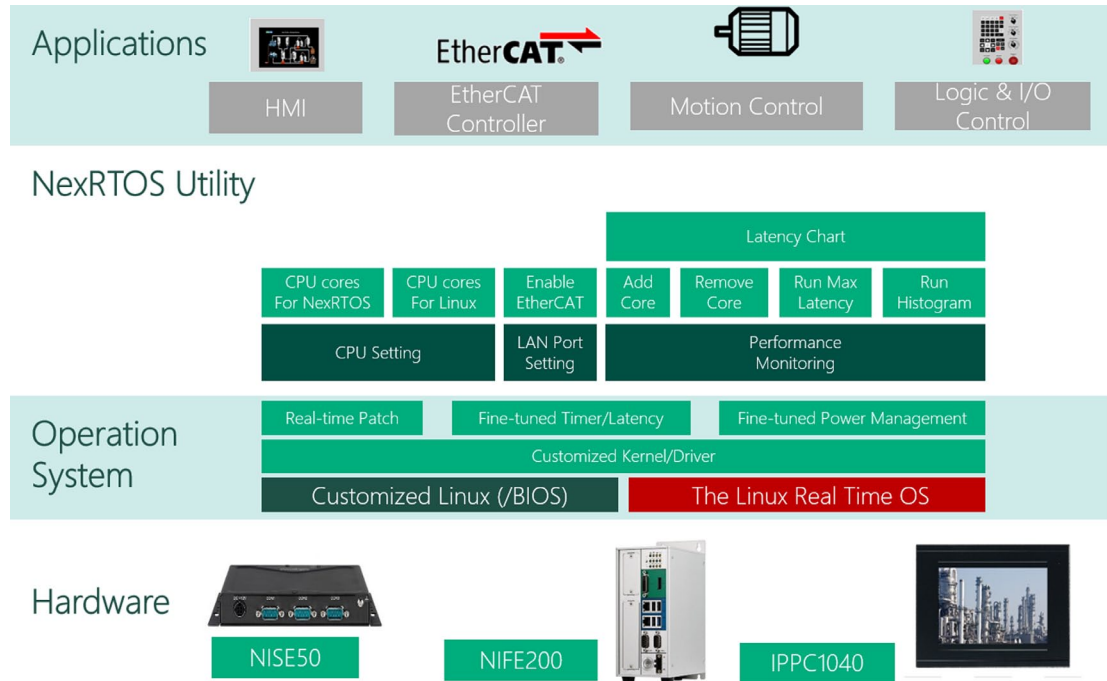
CHAPTER 2: NEXRTOS UTILITY

2. NexRTOS Utility

NexRTOS Utility is a tool for system integrator to configure the real-time core numbers and test the real-time performance when loading is added.
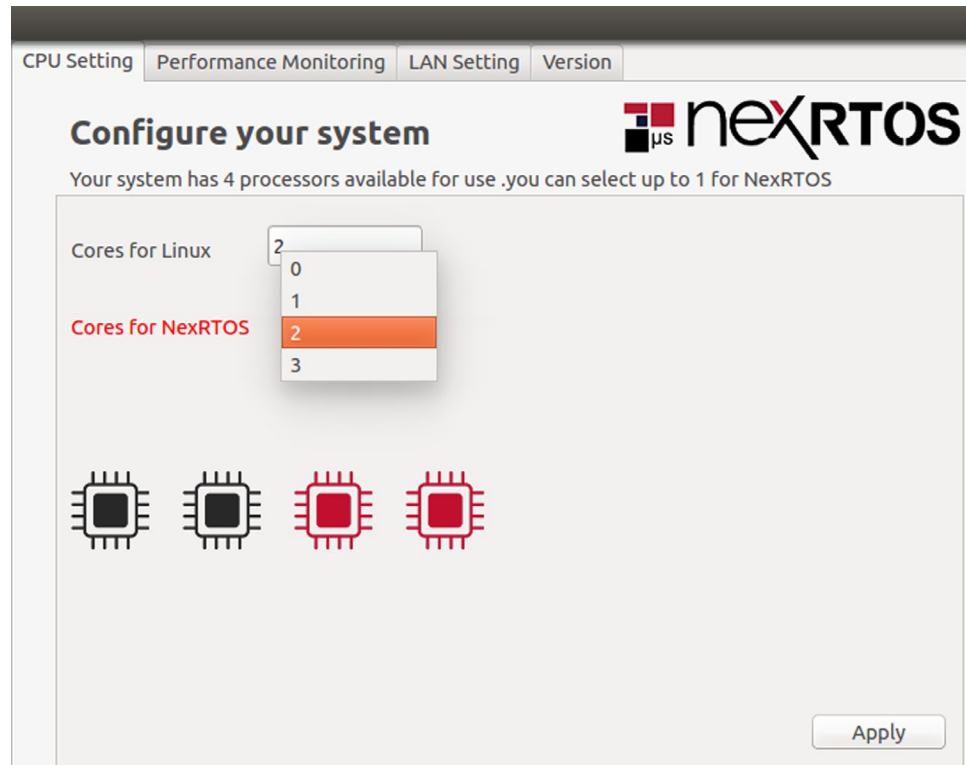
It is now available on selected hardware: NISE 50-J1900, NIFE200 and IPPC1040P. Please contact our sales if other hardware is needed.

Power on the device and launch NexRTOS Utility, you will see four tabs representing the different functional pages.
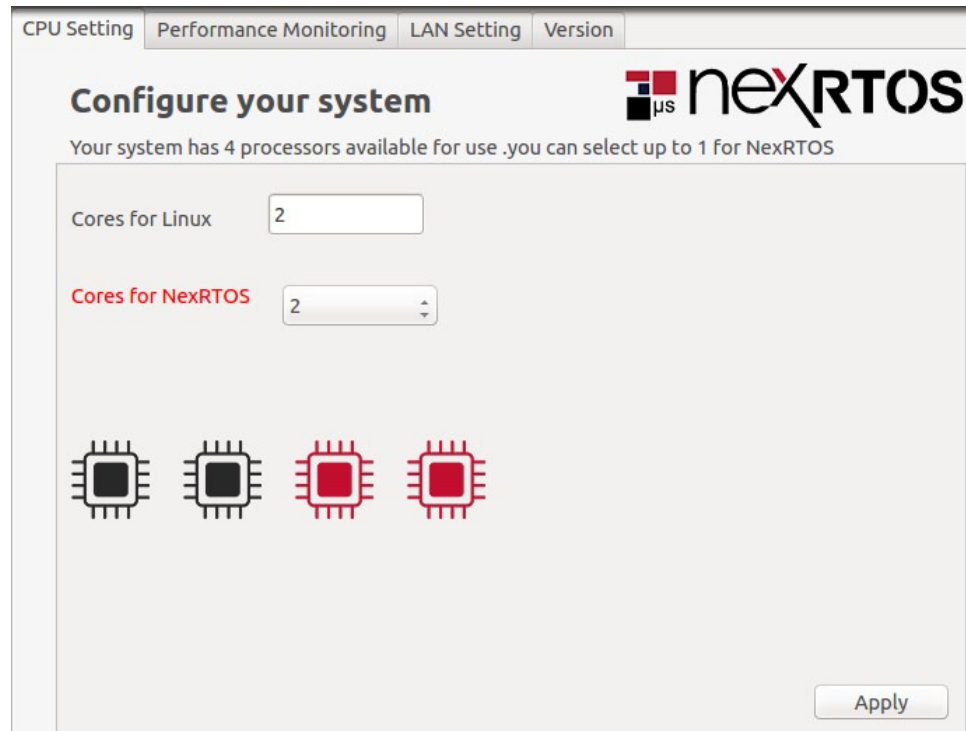
2.1 NexRTOS Utility - CPU Setting

1. Users can allocate CPU core to Linux applications or to NexRTOS Real-time control.

2. After selecting the number of NexRTOS processors, press the **Apply** button.
3. For pop-up warning Message Box, press the **OK** button, it will reboot the machine and apply new settings, The other **CANCEL** button will cancel the reboot action.

2.2 NexRTOS Utility - Performance Monitoring

1. It will show the latency in micro-second for individual CPU cores.

2. By selecting **NexRTOS Core** Radio button, the message window will show the NexRTOS process.

3. By selecting **Linux Core** Radio button, the message window will show the Linux process.
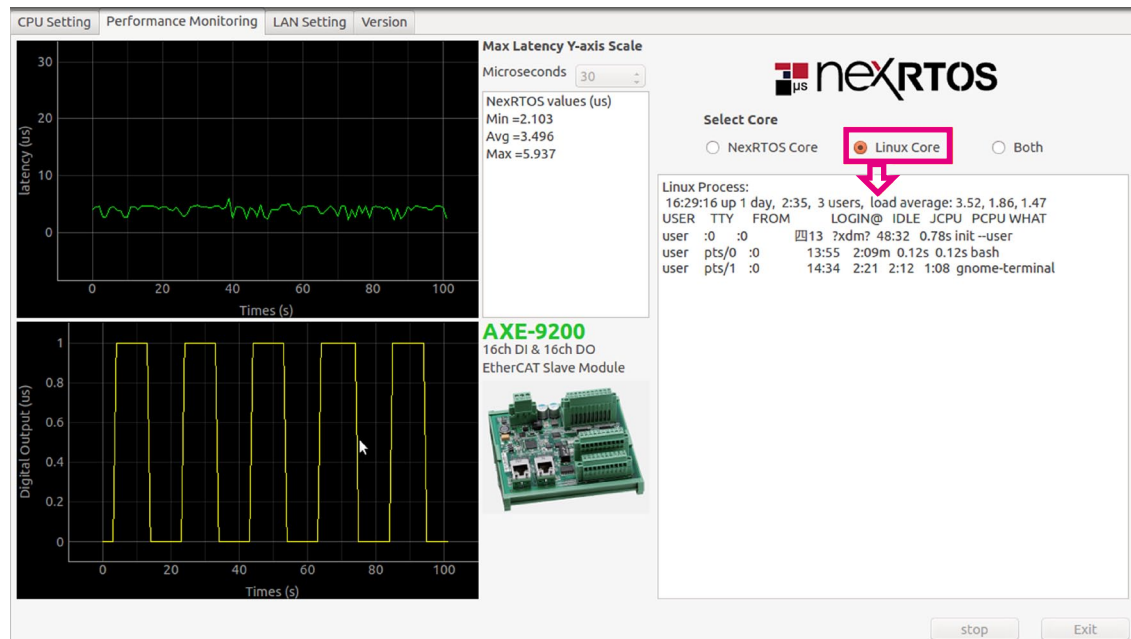
4. By selecting **Both** Radio button, the message window will show both the NexRTOS process and Linux process at the same time
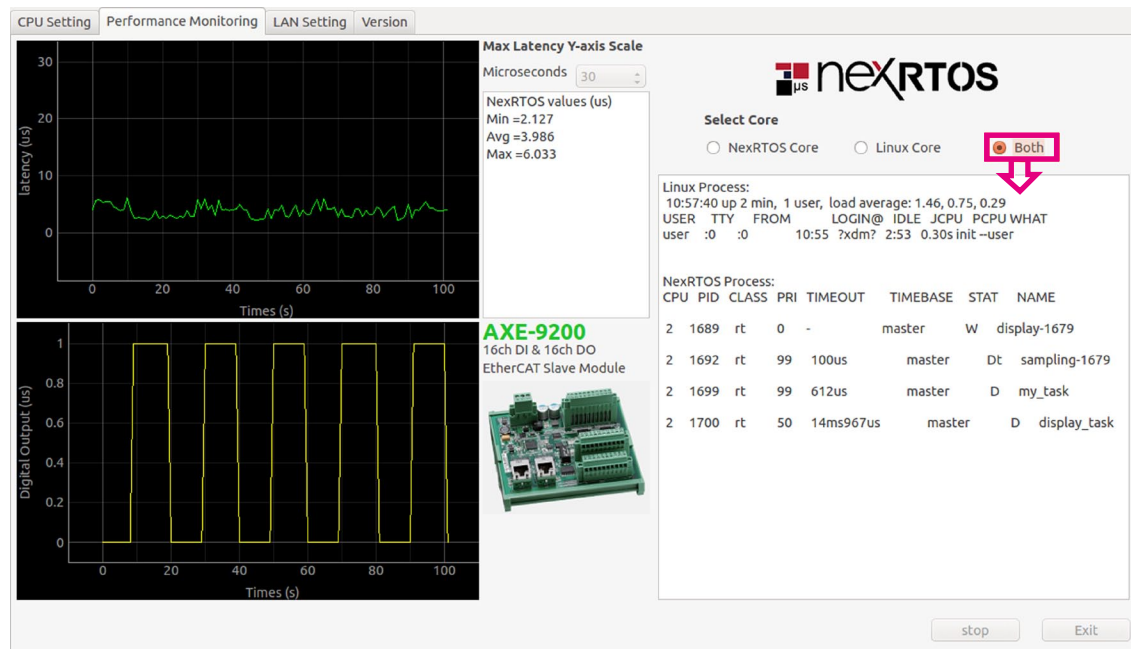
5. The following red rectangle shows the minimum, average and maximum value.
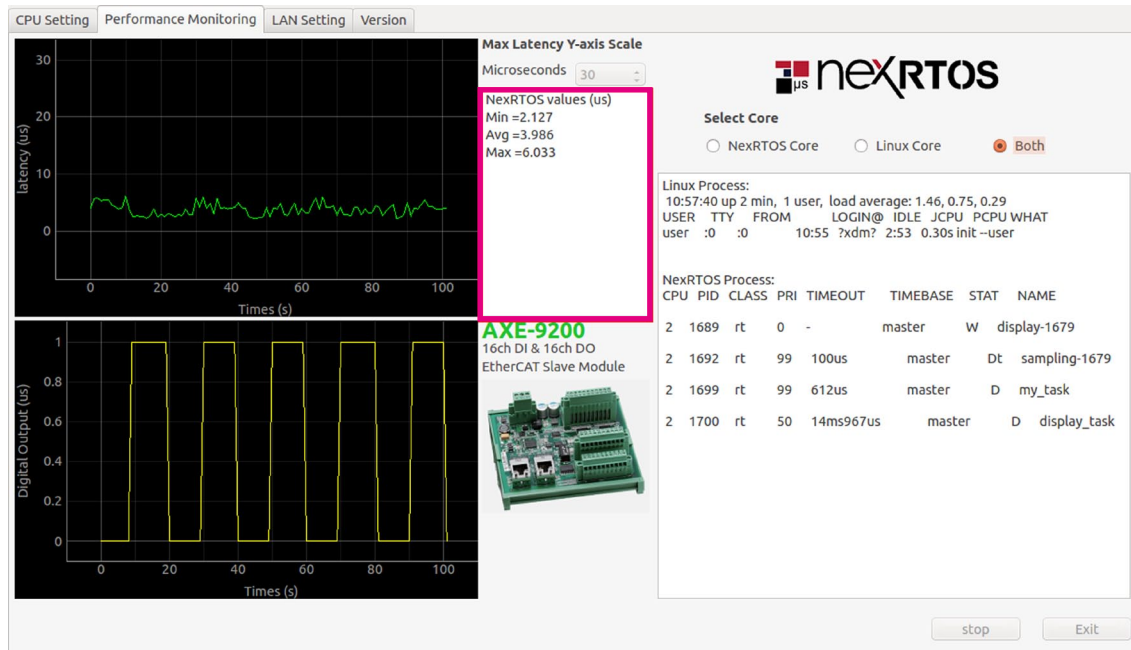
6. The following red rectangle displays the NexRTOS value.
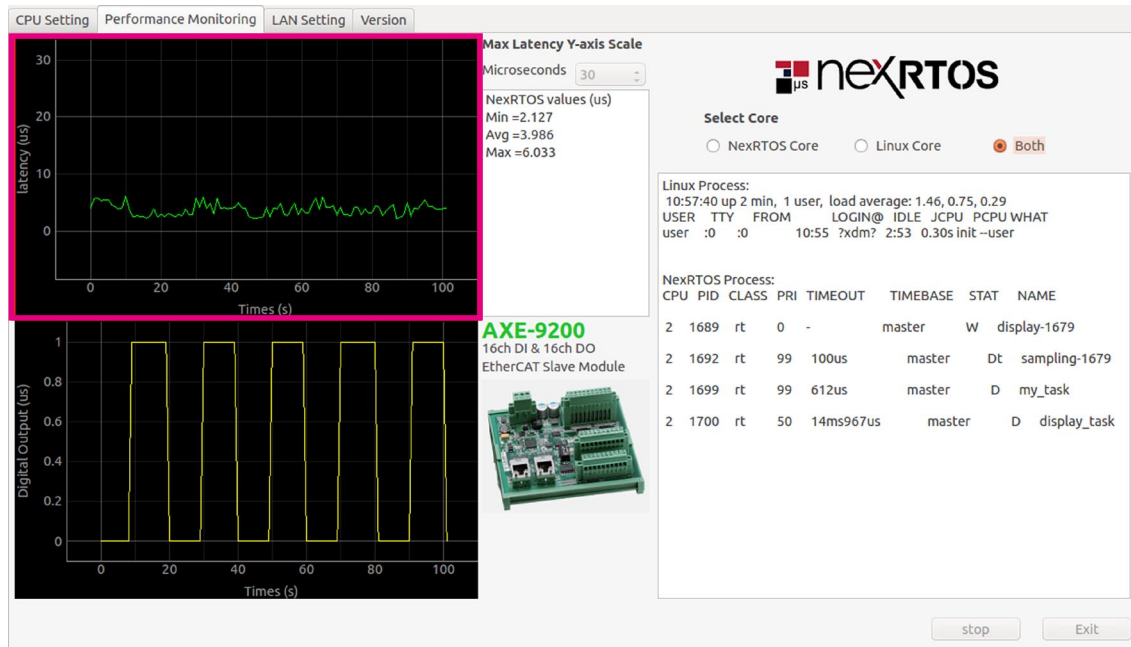
7. The following red rectangle displays the EtherCAT Latency time
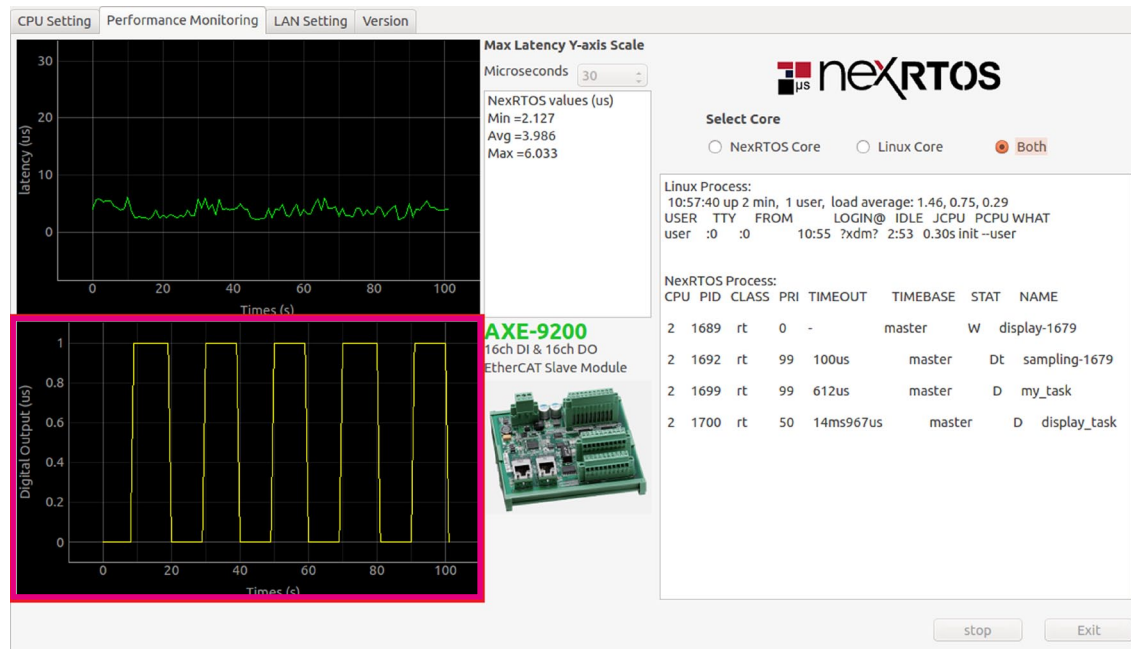
2.3 NexRTOS Utility - EtherCAT setting

1. Select Ethernet Port ETH0 or ETH1 to do EtherCAT port, it will become effective after reboot.

CHAPTER 3: NEXRTOS SUPPORT HARDWARE

3. NexRTOS Support Hardware

NexRTOS now is available on selected hardware. You need to purchase the hardware kits to get the NexRTOS. For other hardware, please contact our sales for information.

Hardware Supported

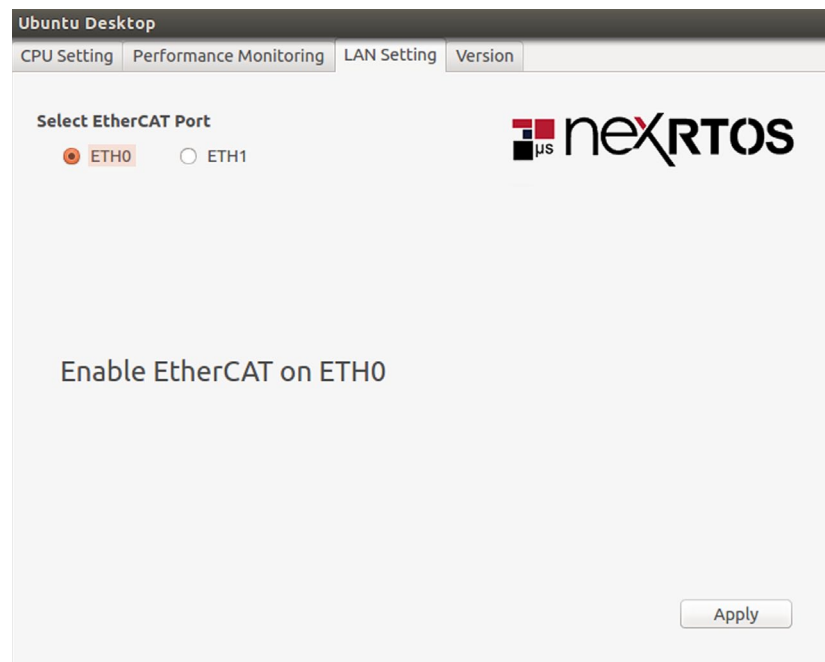| Features	NISE 50-J1900	NIFE200	IPPC1040P
CPU Support	Onboard Intel® Celeron® processor J1900 quad core, 2.00GHz	Onboard Intel® Celeron® processor J1900 quad core, 2.00GHz	Onboard Intel® Celeron® processor J1900 quad core, 2.00GHz
Main Features	1 x HDMI display 2 x Intel® I210AT GbE LAN ports; support WoL, teaming and PXE 4 x USB 2.0 3 x mini-PCIe sockets for optional Wi-Fi/3.5G/LTE modules 2 X RS232, 1 x RS422/485 with auto flow control Support -5~55 degree C operating temperature	1 x DP, 1 x DVI-I for dual inpendent display 2 x Intel® I210AT GbE LAN ports support WoL, Teaming and PXE 3 x USB 2.0, 1 x USB 3.0 2 x RS232/422/485 Front accessible 2.5 SSD/HDD and top accessible SD card for installation 2 x mini-PCIe socket for optional mSATA/Wi-Fi/3.5G/4G LTE/Fieldbus modules Support -5~55 degree Celus operating temperature	Metal housing with robust aluminum front zero bezel for harsh environment 10 points P-Cap multi-touch with zero bezel flush front design Dual GbE/2nd display-VGA/ Line-out 3 x USB/2 x mini-PCIe sockets/1 x CFast/2 x RS232/422/485 DDR3L 4GB/2.5" HDD bracket IP66 compliant front panel Mounting support: panel/wall/stand/VESA 100mm x 100mm Wide range power input 12~30VDC
Power Requirements	60W 12V/5A AC/DC power adapter w/o power cord (P/N: 7400060051X00)	24V, 60W AC/DC power adapter w/ o power cord (P/N:7400060054X00)	12V, 60W AC/DC power adapter w/o power cord (P/N: 7400060031X00)
Ordering Information	NISE 50-J1900 (P/N: 10J00005029X0)	NIFE 200 (P/N: 10J70020000X0)	IPPC 1040P (P/N: 10II1040P04X0)

	AXE-9200	NEX 650	MCB 355
CPU Support	16ch Digital Input and 16ch Digital Output EtherCAT Slave Module	Mini-ITX Form Factor with Onboard Intel® Celeron® Processor J1900 Product Family	Intel® Celeron® processor, Bay Trail J1900
Key Features	• High density I/O module • Multi-functional digital input/output • High-performance EtherCAT communication • Support bipolar (sinking and sourcing) input • Quick and easy installation • Configuration free	• Intel® Celeron® processor J1900 • Integrated Intel® Gen7 Intel® Graphics DX 11*, OGL3.2 • Supports dual channel DDR3 1333MHz, 2 x SO-DIMM, up to 8GB system memory • 3 x COM (RS-232/422/485), 2 x COM (RS-232); 1 x HDMI, 1 x D-Sub, • 1 x Dual channel 24-bit LVDS; 4 x USB 3.0, 6 x USB 2.0, 2 x SATA2; Gigabit LAN : 2 x Realtek LAN • 12~24 V DC-in power support	• 2 x I210 LAN port for EtherCAT communication • Encoder, D/I, D/O , MPG support • 2x Mechatrolink III support
Power Requirements	DC input range: DC 24V ±10% with over-voltage and reversed-voltage protection	12~24 V DC-in power support	• DC 24V input
Orfering Information	AXE-9200 (P/N: 10J40920000X0)	NEX 650 (P/N: 10G00065001X1)	MCB355 (P/N: 6879MB350000F)