

DA-PRP-HSR-I210 Expansion Module Installation Guide

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DA-PRP-HSR-I210 Expansion Module Installation Guide

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1. Introduction

Thank you for purchasing Moxa's DA-PRP-HSR-I210 expansion card for the DA-820C Series industrial computer. This manual includes information on installing the hardware and driver for the expansion card.

Overview

The DA-PRP-HSR-I210 expansion card is compliant with IEC 62439-3 Clause 4 (PRP) and IEC 62439-3 Clause 5 (HSR) standards to ensure the highest system availability and data integrity for mission-critical applications that require zero-time recovery and redundancy.

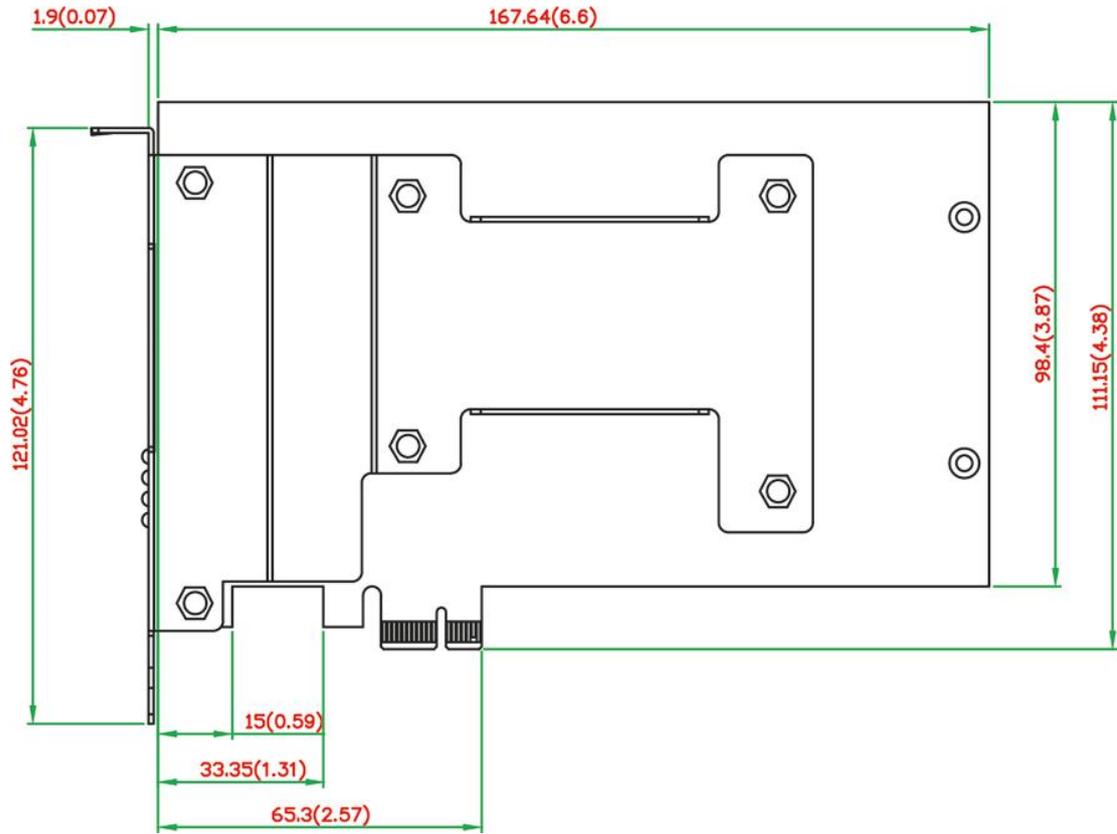
With its dual Gigabit Ethernet port design, the DA-PRP-HSR-I210 provides high performance for redundant network systems. In addition, the DA-PRP-HSR-I210 features a built-in native PRP/HSR management middleware with MMS server that allows SCADA systems to collect IEC 62439-3 registers from multiple devices for easy network diagnosis, troubleshooting, device management, and monitoring.

Moxa's DA-820C Series industrial computer with the DA-PRP-HSR-I210 expansion card is the ideal solution for power substation automation and process automation systems.

Appearance



Dimensions



2. Hardware Installation

This chapter describes the basic hardware installation of the DA-PRP-HSR-I210 expansion card.

Handling Static-sensitive Components

Static electricity can damage electronic components. To avoid damage, keep electronic components in their anti-static bags until you are ready to use them.

To reduce the possibility of damage to an electronic component from electrostatic discharge, take the following precautions:

- Wear a wrist strap to ground yourself while working with electronic components.
- Limit your movement; movement can create static electricity around you.
- Hold the component by its edges or frame.
- Avoid touching solder joints, pins, or exposed printed circuitry.
- Do not place the component directly onto a metal surface.
- While the component is still in its anti-static bag, place it in contact with an unpainted metal part for at least two seconds to discharge any static electricity from the package and from your body.
- After you remove the component from its package, install it directly. If you need to put the component down, place it on its anti-static bag.
- Take additional care when handling components in air-conditioned rooms and in cold weather because air conditioning and heating reduce indoor humidity and increase static electricity.

Installing the DA-PRP-HSR-I210 Expansion Card



NOTE

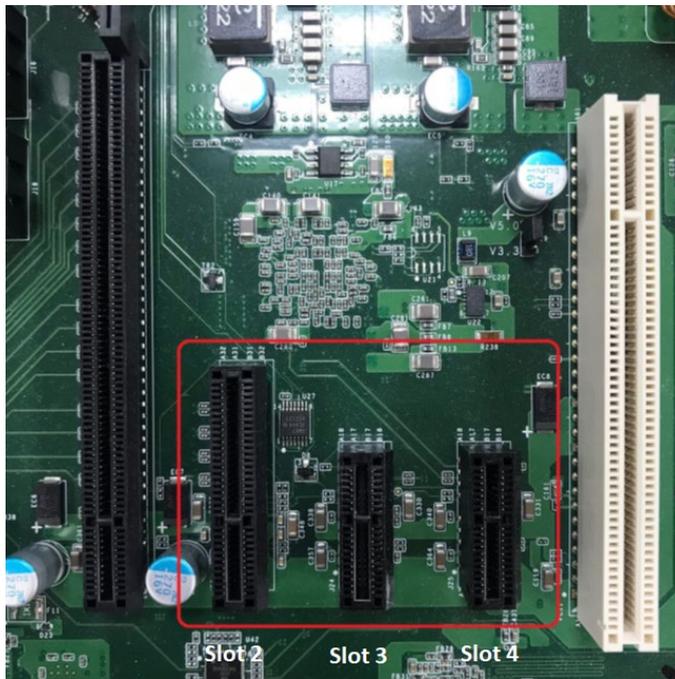
The DA-PRP-HSR-I210 expansion card can only be installed in a DA-820C computer. You can install up to three DA-PRP-HSR-I210 expansion cards in the PCI slots 2 to 4 of a DA-820C computer. Start with slot 3 and then install expansion cards in other slots if you are installing more than one.

To install the DA-PRP-HSR-I210, complete the following steps:

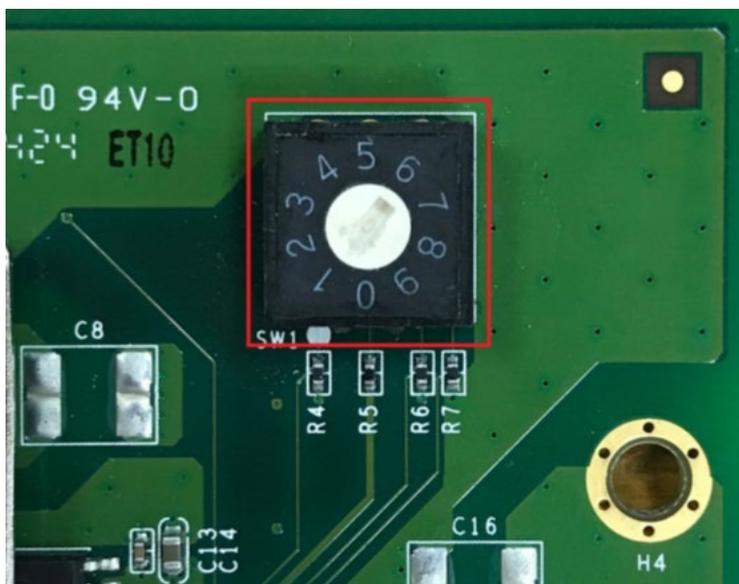
1. Turn off the DA-820C computer and disconnect it from the power source.
2. Loosen the screws on the rear of the DA-820C computer and remove the top cover.

3. Remove the PCI slot cover on the rear panel and install the DA-PRP-HSR-I210 expansion card(s).
The DA-PRP-HSR-I210 expansion card can be installed on PCI slots 2 to 4 of the DA-820C computer. If you need to install more than one expansion card, install the cards next to each other continuously in PCI slots 2 to 4.

The following figure indicates the PCI connectors on the system board.



Similarly, turn the card index selection switch to **1** for the second DA-PRP-HSR-I210 card and turn the card index selection switch to **2** for the third DA-PRP-HSR-I210 installed. The following figure shows the location of the card index selection switch on the DA-PRP-HSR-I210.



6. Replace the PCI slot cover and fasten the screw to secure the DA-PRP-HSR-I210 to the computer chassis.
7. Put back the top cover on the DA-820C.
8. Install the driver and configure the PRP/HSR settings to start using the DA-PRP-HSR-I210.

9. For details on modifying the Ethernet settings or reassigning the system information for a DA-PRP-HSR-I210 card, see "3. Installing the Driver and Utility".

Removing the DA-PRP-HSR-I210 Expansion Card

To remove a DA-PRP-HSR-I210 from a DA-820C computer, complete the following steps:

1. Turn off the computer and disconnect the power source.
2. Loosen the screws on the rear of the DA-820C computer and remove the top cover.
3. Loosen the screw that secures the DA-PRP-HSR-I210 to the computer chassis.
4. Pull to remove the DA-PRP-HSR-I210 from the system board.
5. Replace the PCI slot cover and the top cover of the DA-820C computer.

LED Indicators

LED Name	Color	Function
1G_A	Yellow steady/blinking	1000 Mbps (Gigabit) Ethernet mode
1G_A	Off	No link
100M_A	Green steady/blinking	100 Mbps Ethernet mode
100M_A	Off	No link
1G_B	Yellow steady/blinking	1000 Mbps (Gigabit) Ethernet mode
1G_B	Off	No link
100M_B	Green steady/blinking	100 Mbps Ethernet mode
100M_B	Off	No link
PRP	Green	The DA-PRP-HSR-I210 is operating in PRP mode
HSR	Green	The DA-PRP-HSR-I210 is operating in HSR mode
Fault	Red	No Ethernet connection on LAN A or LAN B

3. Installing the DA-PRP-HSR-I210 Driver and Utility

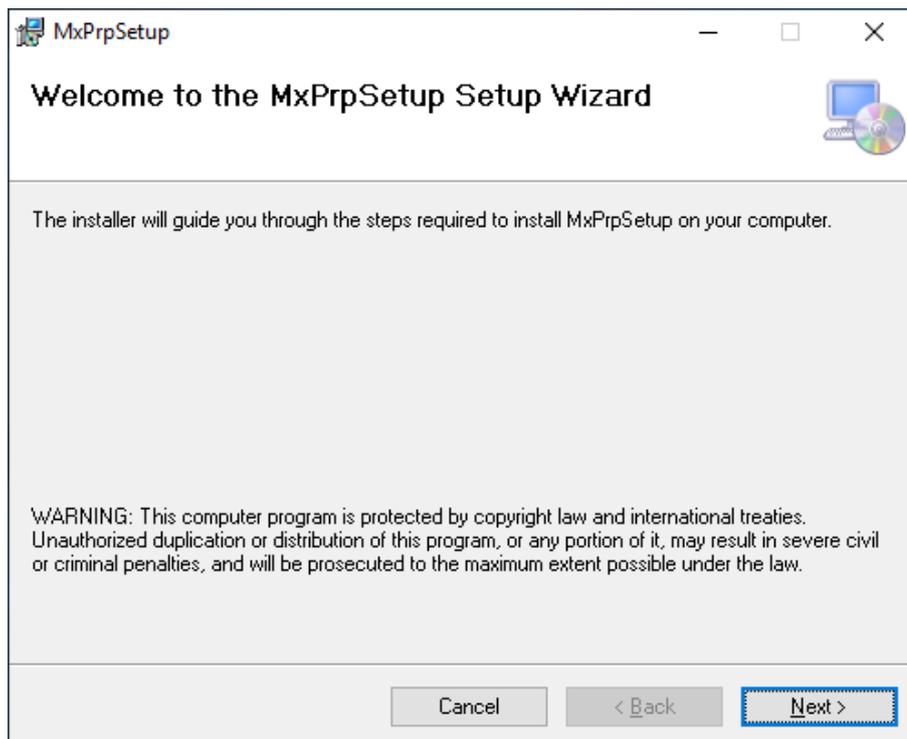
Installing the Driver and Utility



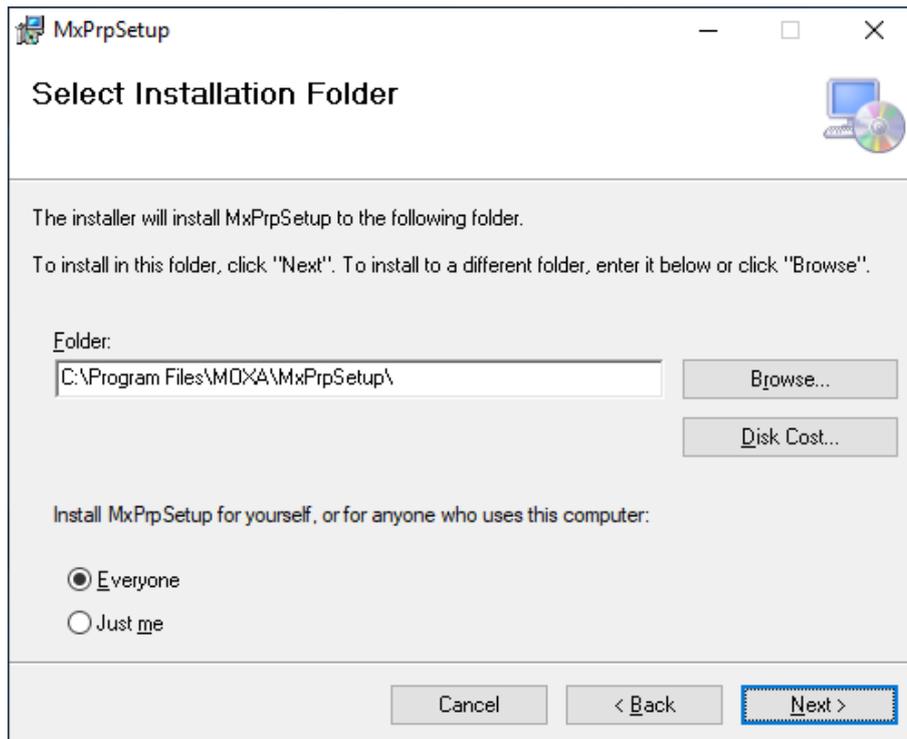
NOTE

The DA-PRP-HSR-I210 driver and utility are supported on Windows 10.

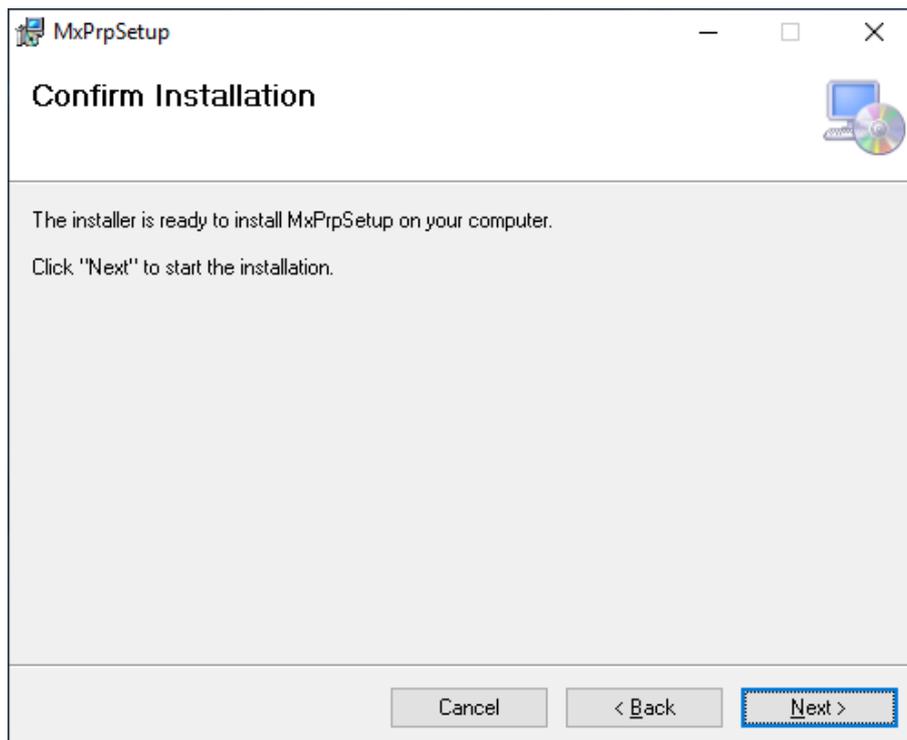
1. Connect a monitor, keyboard, and a mouse to the DA-820C computer.
For more information, see the DA-820C Series Embedded Computer User's Manual.
2. Turn on the computer.
3. Download the DA-PRP-HSR-I210 driver from Moxa's support website at <https://www.moxa.com/en/support> to the DA-820C computer.
4. Double-click the **DA-PRP-HSR-I210_MxPrpSetup_x64.msi** file to start the installation process.
The installation wizard will show the welcome page.
5. Click **Next**.



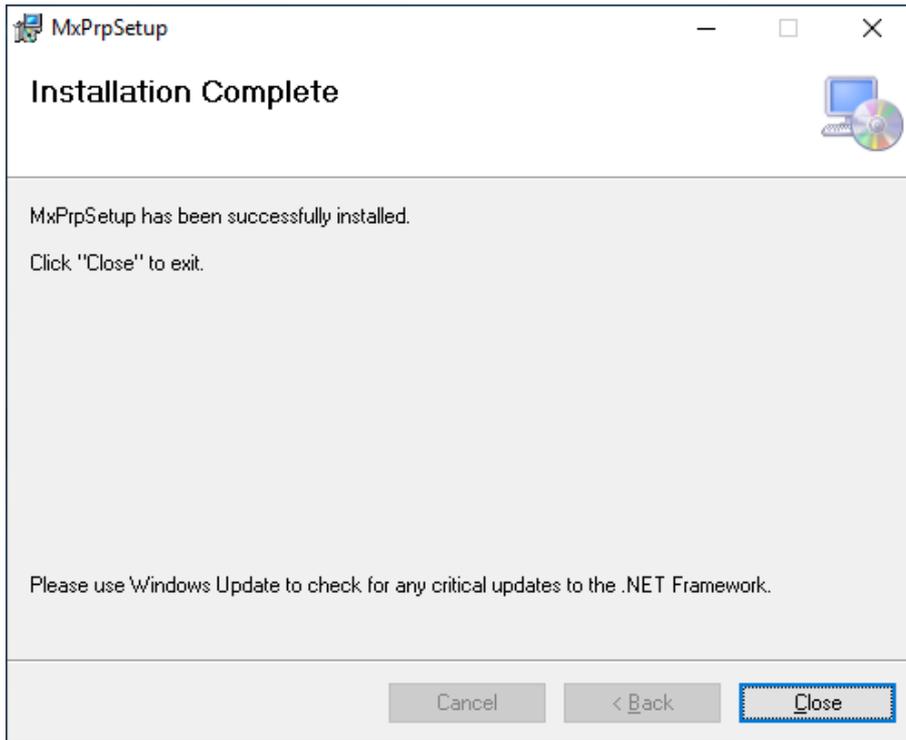
6. Accept the default installation directory or click **Browse** to select one and click **Next**.



7. Click **Next** to continue.

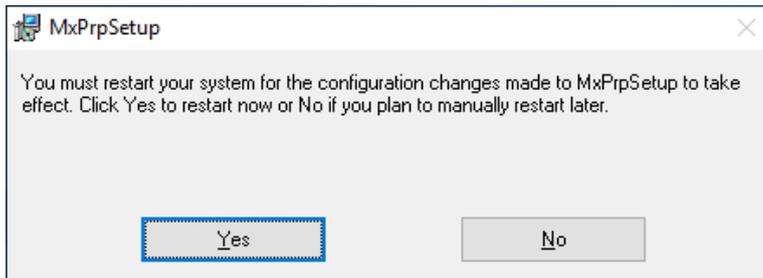


8. Click **Close** to complete the installation.

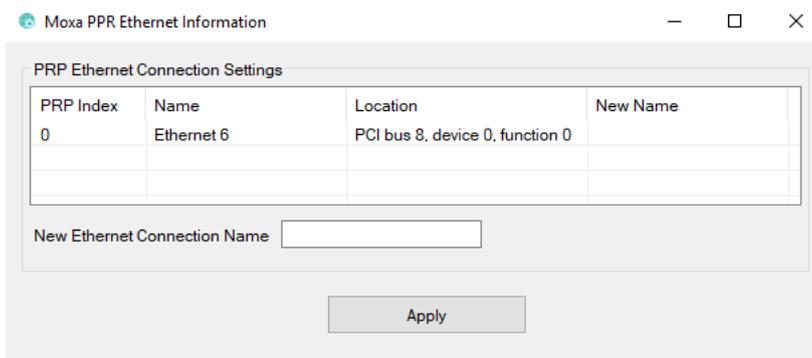


The Moxa PRP Service is installed on the computer.

9. In the message box that pops up, click **Yes**.



The **Moxa PRP Ethernet Information** utility will run automatically when you restart the computer.



Changing the Default Name of the Expansion Cards

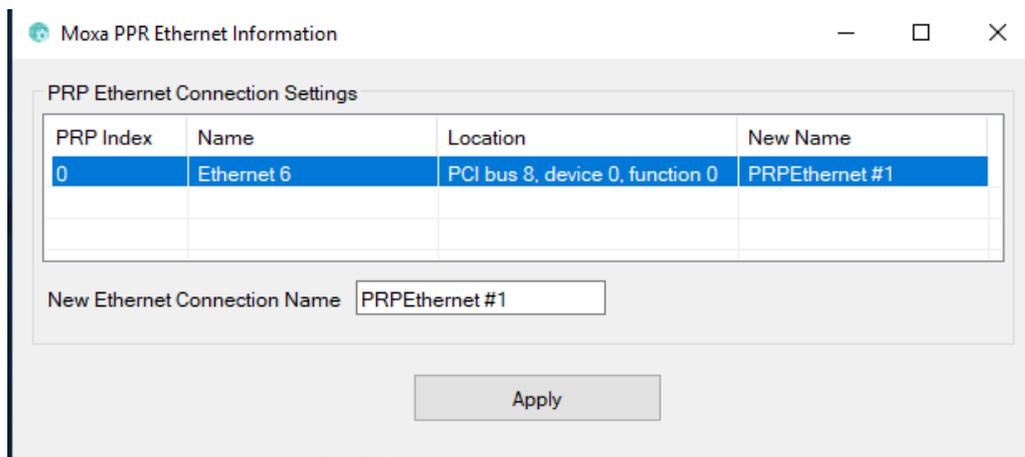


NOTE

If a new PRP card is installed on the computer or removed from the computer, the **Moxa PRP Ethernet Information utility** will run automatically when the computer reboots. Use the utility to configure the new card.

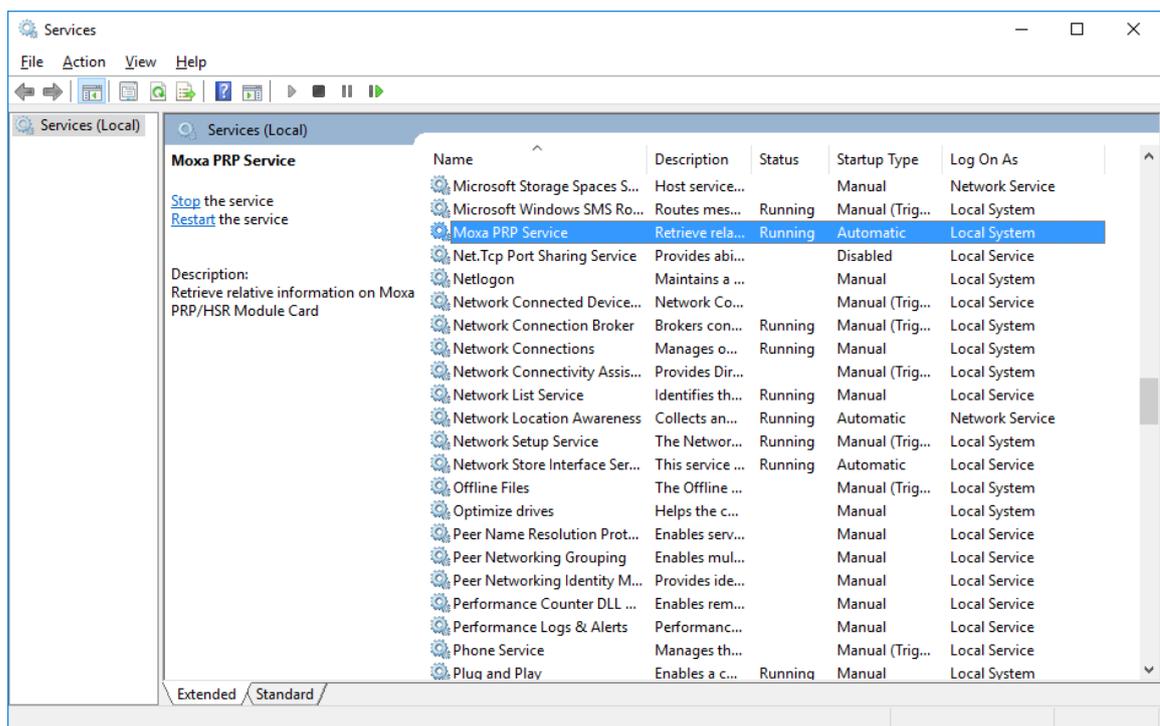
The utility sets a default name for each card, which can be changed. In the example below, the **PRP Index** represents the PRP index switch selection and the location of the PRP expansion card, which can be obtained from the device manager.

To change the default name for an expansion card, click on the entry for the card in the utility window, change the default name, and click **Apply**.

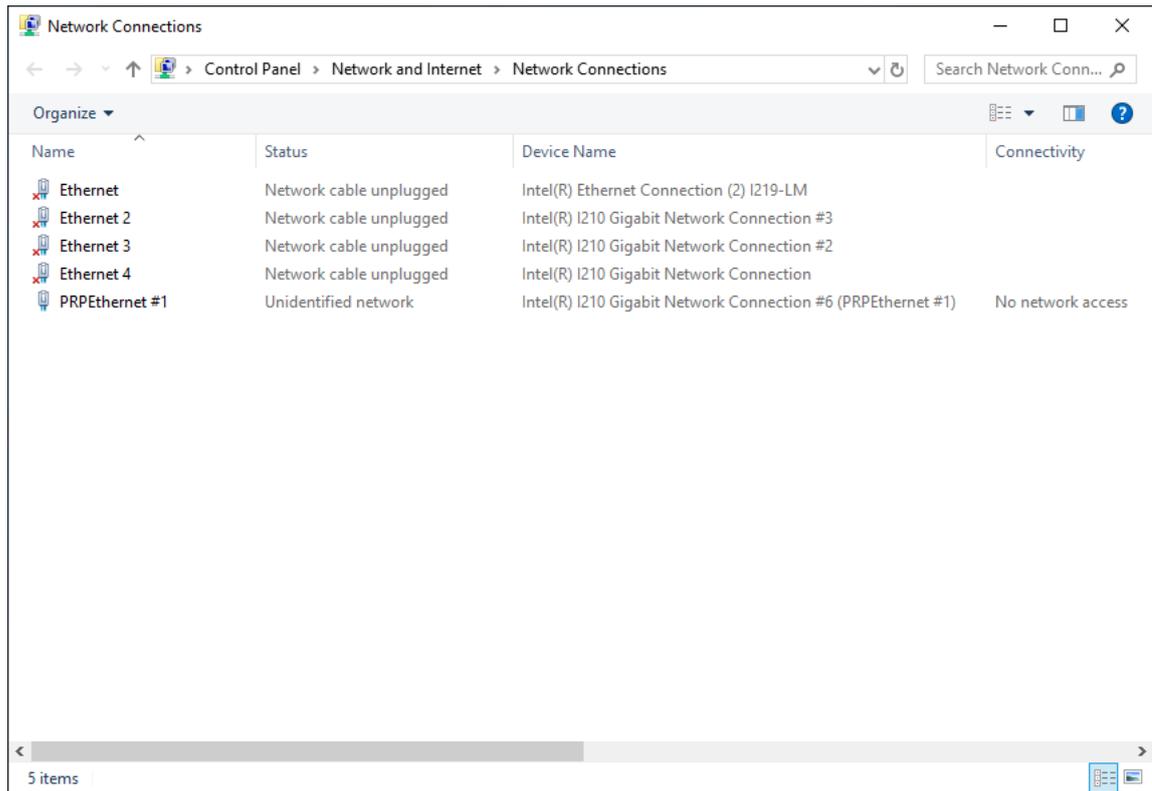


You will be prompted to restart the computer.

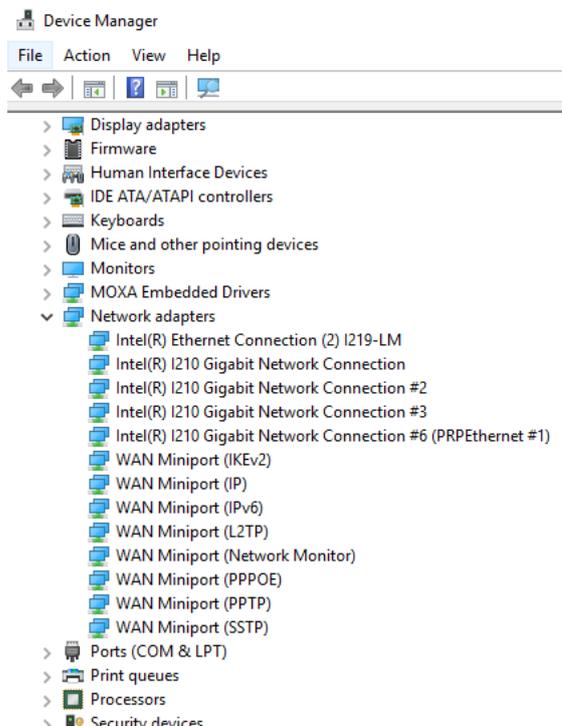
After the computer is restarted, the Moxa PRP Service will run.



The DA-PRP-HSR-I210 card uses the same Intel® Ethernet driver as the onboard Ethernet adapters. All expansion cards installed on the computer are shown as individual Ethernet adapters.



You can also confirm the name change of the expansion card by checking the Ethernet adapter names in the Device Manager.

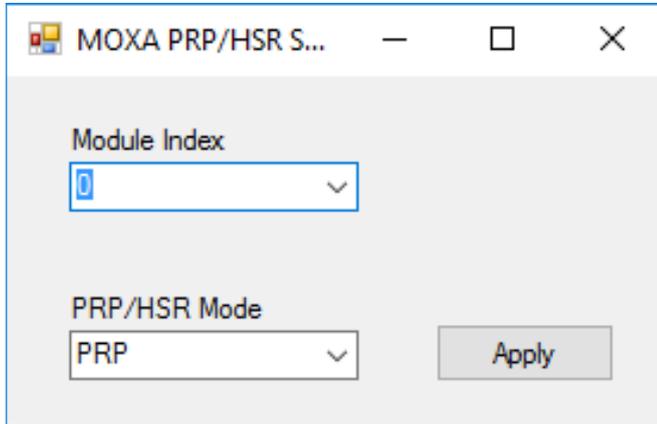


Configuring the Operation Mode

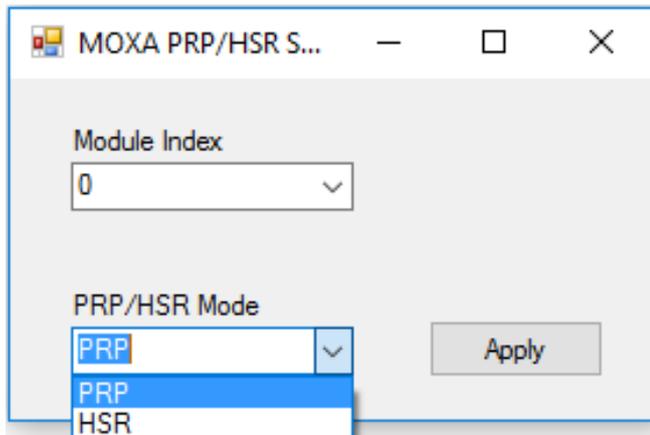
You can use the **Moxa PRP Settings** utility to set the operating mode (PRP or HSR) for a DA-PRP-HSR_I210 expansion card.

1. Run the **Moxa PRP Settings** utility from the Start menu.
2. Select the expansion card.

If more than one DA-PRP-HSR-I210 expansion cards are installed on the computer, use the Module Index (0 to 2) drop-down menu to select the card that you want to configure.



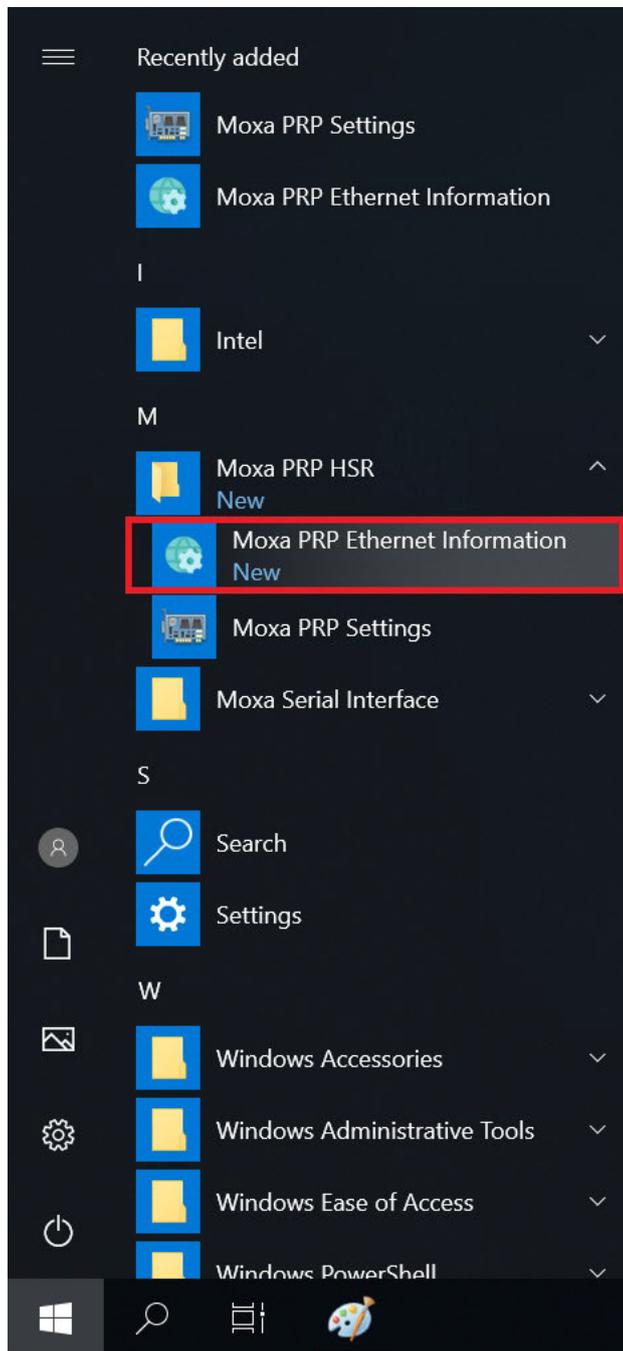
3. From the **PRP/HSR Mode** drop-down list, select an option and click **Apply**.



Redefining the Ethernet Information

The **Moxa PRP Ethernet Information** utility can be used to redefine the DA-PRP-HSR-I210 Ethernet information in the system.

1. Run the **Moxa PRP Ethernet Information** utility from the Start Menu.



- In the utility screen, select the expansion card.

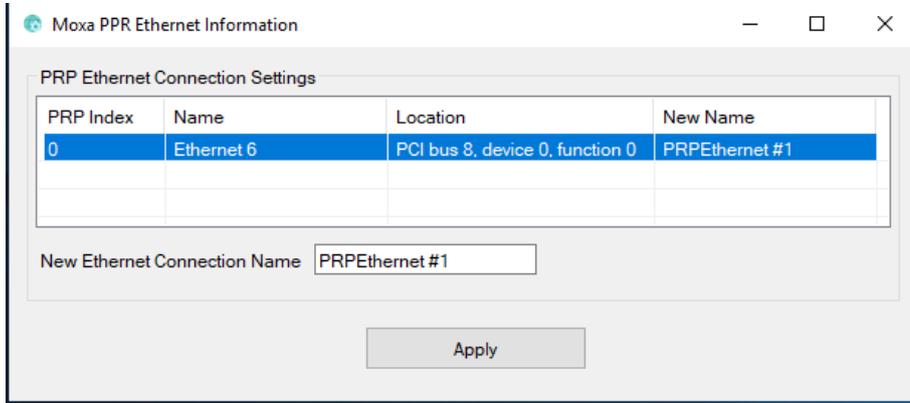
PRP Index: Select the target PRP card index (the index set by the switch in the expansion card)

Location: PCI bus location of the target PRP card.

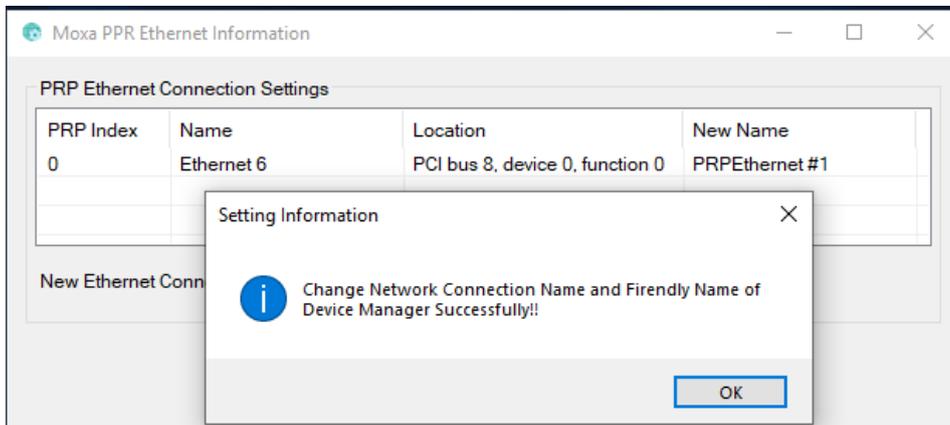
Name: Type the network connection name of target PRP card.

In this example, we are redefining the name of the card.

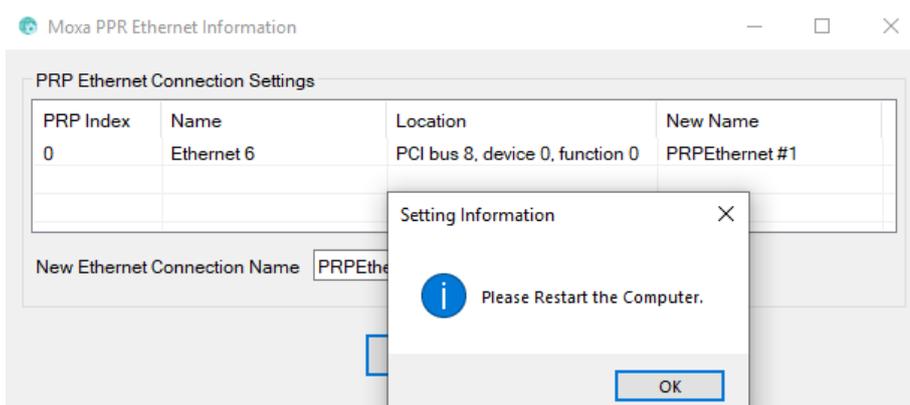
New Name: The new name to set.



After the Ethernet information has been successfully redefined, a message is shown. Click **OK**.



- Restart the computer.

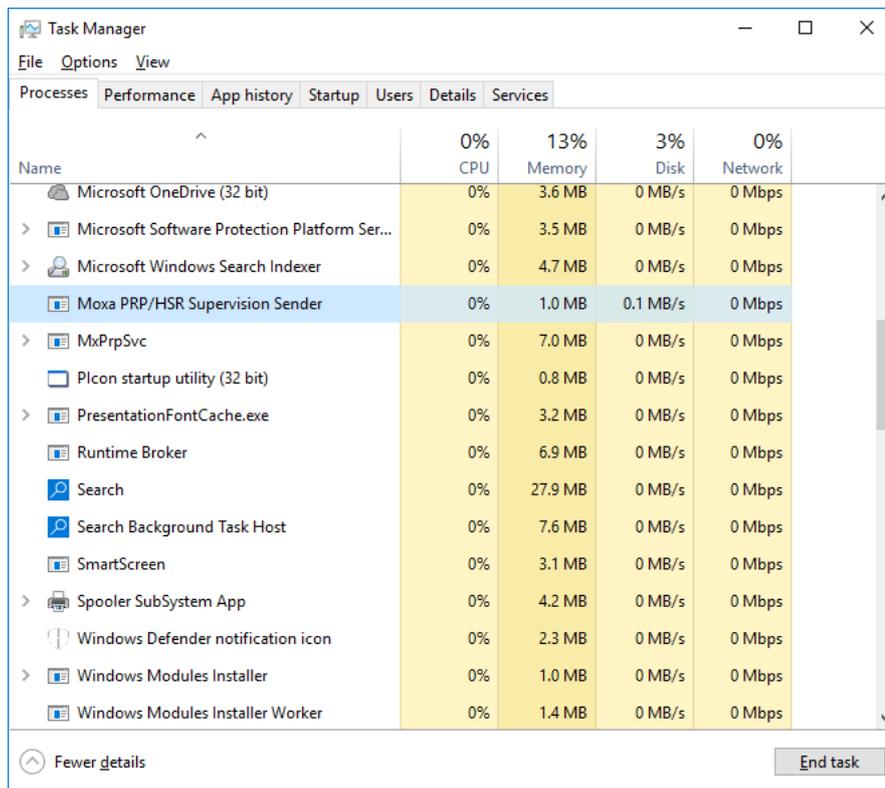


PRP/HSR Supervision Frame

The supervision frame of DA-PRP-HSR-I210 expansion card is based on WinPcap. Before you start sending the PRP/HSR supervision frame, you must download and install the WinPcap tool from <https://www.winpcap.org/> and check the supervision frame.

To check the PRP/HSR supervision frame, do the following:

1. Install the WinPcap tool on the DA-820C.
2. Install DA-PRP-HSR-I210_MxPrpSetup_x64.msi
3. Wait for the Moxa PRP Service to initialize.
4. The Moxa PRP/HSR Supervision Sender service will start running.



The screenshot shows the Windows Task Manager window with the 'Performance' tab selected. The 'Processes' tab is active, displaying a list of running processes. The 'Moxa PRP/HSR Supervision Sender' process is highlighted in blue. The table below represents the data shown in the screenshot.

Name	CPU	Memory	Disk	Network
Microsoft OneDrive (32 bit)	0%	3.6 MB	0 MB/s	0 Mbps
Microsoft Software Protection Platform Ser...	0%	3.5 MB	0 MB/s	0 Mbps
Microsoft Windows Search Indexer	0%	4.7 MB	0 MB/s	0 Mbps
Moxa PRP/HSR Supervision Sender	0%	1.0 MB	0.1 MB/s	0 Mbps
MxPrpSvc	0%	7.0 MB	0 MB/s	0 Mbps
Plcon startup utility (32 bit)	0%	0.8 MB	0 MB/s	0 Mbps
PresentationFontCache.exe	0%	3.2 MB	0 MB/s	0 Mbps
Runtime Broker	0%	6.9 MB	0 MB/s	0 Mbps
Search	0%	27.9 MB	0 MB/s	0 Mbps
Search Background Task Host	0%	7.6 MB	0 MB/s	0 Mbps
SmartScreen	0%	3.1 MB	0 MB/s	0 Mbps
Spooler SubSystem App	0%	4.2 MB	0 MB/s	0 Mbps
Windows Defender notification icon	0%	2.3 MB	0 MB/s	0 Mbps
Windows Modules Installer	0%	1.0 MB	0 MB/s	0 Mbps
Windows Modules Installer Worker	0%	1.4 MB	0 MB/s	0 Mbps

5. Install the Wireshark tool on a PC and run the tool with the "hsr_prp_supervision" filter to wait for the PRP supervision frames.
6. Connect port A or port B of the DA-PRP-HSR-I210 to the Ethernet port of the PC.
7. Use the Moxa PRP Settings utility to set the PRP/HSR mode.
8. Check the supervision frame using the Wireshark tool.

PRP Supervision Frame

Capturing from 區域連線

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

hsr_prp_supervision

No.	Time	Source	Destination	Protocol	Length	Info
3133	1038.714345	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3137	1040.729941	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3140	1042.745453	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3146	1044.761089	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3150	1046.776562	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3153	1048.792191	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3158	1050.807634	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3162	1052.823302	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3165	1054.838905	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3172	1056.854444	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3181	1060.030294	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3185	1062.041793	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3189	1064.057315	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3192	1066.072794	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3196	1068.088432	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3202	1070.104012	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3208	1072.119585	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3211	1074.135104	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision

▸ Frame 3172: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0
 ▸ Ethernet II, Src: MoxaTech_00:e5:0f (00:90:e8:00:e5:0f), Dst: Iec_00:01:00 (01:15:4e:00:01:00)
 ▸ HSR/PRP Supervision (IEC62439 Part 3)
 0000 = Path: 0
 0000 0000 0001 = Version: 1
 Sequence number: 483
 TLV type: PRP Node (Duplicate Discard) (20)
 TLV length: 6
 Source MAC Address: MoxaTech_00:e5:0f (00:90:e8:00:e5:0f)
 TLV type: Redundancy Box MAC Address (30)
 TLV length: 6
 RedBox MAC Address: MoxaTech_00:e5:0f (00:90:e8:00:e5:0f)
 TLV type: End of TLVs (0)
 TLV length: 0
 ▸ VSS-Monitoring ethernet trailer, Source Port: 806
 Src Port: 806

```

0000 01 15 4e 00 01 00 00 90 e8 00 e5 0f 88 fb 00 01  ..N.....
0010 01 e3 14 06 00 90 e8 00 e5 0f 1e 06 00 90 e8 00  ..B.....
0020 e5 0f 00 00 00 00 00 00 00 00 00 00 00 00 00  ..
0030 00 00 00 00 00 00 00 00 00 00 00 03 26 a0 34  ..&.4
0040 88 fb ..
  
```

HSR Supervision Frame

Capturing from 區域網路

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

hsr_prp_supervision

No.	Time	Source	Destination	Protocol	Length	Info
3165	1054.838905	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3172	1056.854444	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	PRP Supervision
3181	1060.030294	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3185	1062.041793	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3189	1064.057315	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3192	1066.072794	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3196	1068.088432	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3202	1070.104012	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3208	1072.119585	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3211	1074.135104	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3222	1076.150654	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3227	1078.166251	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3230	1080.181814	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3234	1082.197383	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3239	1084.212621	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3244	1086.228421	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3256	1088.244045	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision
3266	1090.259591	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66	HSR Supervision

▶ Frame 3181: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0
 ▶ Ethernet II, Src: MoxaTech_00:e5:0f (00:90:e8:00:e5:0f), Dst: Iec_00:01:00 (01:15:4e:00:01:00)
 ▶ High-availability Seamless Redundancy (IEC62439 Part 3 Chapter 5)
 ▲ HSR/PRP Supervision (IEC62439 Part 3)

```

0000 .... = Path: 0
... 0000 0000 0001 = Version: 1
Sequence number: 484
TLV type: HSR Node (23)
TLV length: 6
Source MAC Address: MoxaTech_00:e5:0f (00:90:e8:00:e5:0f)
TLV type: Redundancy Box MAC Address (30)
TLV length: 6
RedBox MAC Address: MoxaTech_00:e5:0f (00:90:e8:00:e5:0f)
TLV type: End of TLVs (0)
TLV length: 0
  
```

```

0000 01 15 4e 00 01 00 00 90 e8 00 e5 0f 89 2f 00 34 ..N...../.4
0010 03 29 88 fb 00 01 01 e4 17 06 00 90 e8 00 e5 0f .).....
0020 1e 06 00 90 e8 00 e5 0f 00 00 00 00 00 00 00 .....
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0040 00 00 .....
  
```