

Add an Industrial Computer to an Existing HSR/PRP Network – Without Compromising Redundancy!

Modern power automation and substation networks increasingly rely on **HSR (High-availability Seamless Redundancy)** and **PRP (Parallel Redundancy Protocol)** to provide highly available Ethernet communication.

But what happens when an industrial computer, server or data acquisition system needs to be added to an existing HSR or PRP infrastructure?

The **Advantech ECU-P1522LPE** provides a practical solution.

HSR and PRP directly inside the computer

The ECU-P1522LPE is a low-profile PCI Express communication card that adds **HSR and PRP functionality according to IEC 62439-3** to a compatible industrial computer.

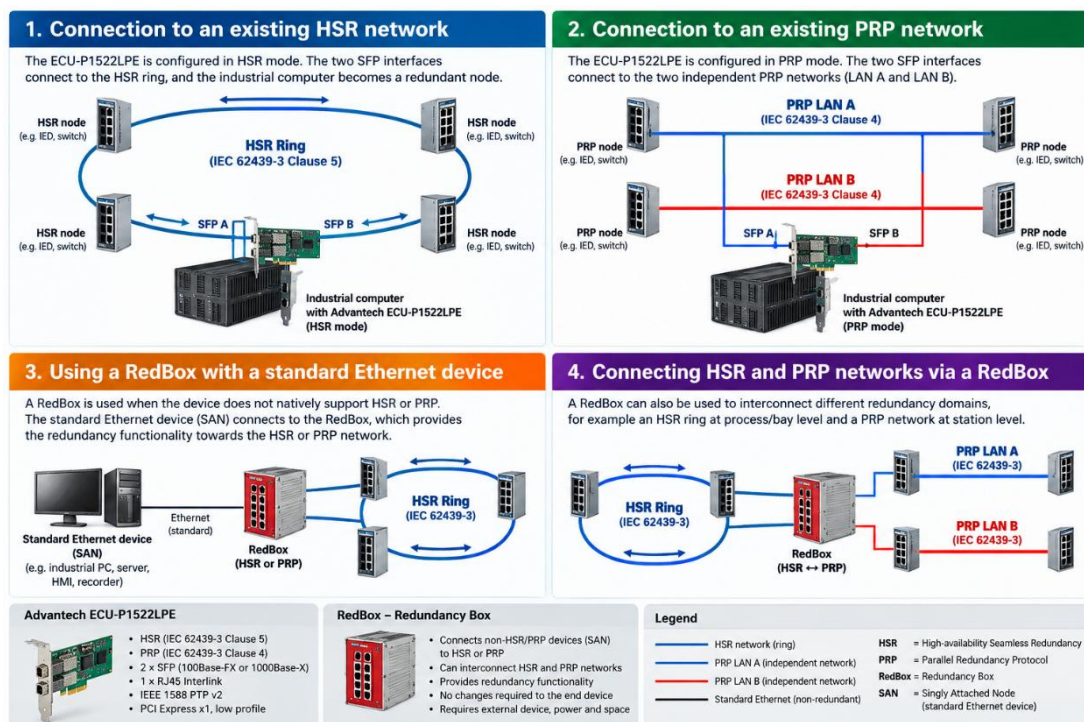
Instead of connecting the computer through an additional external redundancy device, the HSR/PRP interface can therefore be integrated directly into the computer.

The card supports **HSR according to IEC 62439-3 Clause 5 and PRP according to Clause 4**, with two SFP interfaces supporting 100Base-FX or 1000Base-X, an RJ45 Interlink interface and IEEE 1588 PTP v2 support.

Connecting to an existing HSR network

In an HSR installation, the ECU-P1522LPE can be configured in **HSR mode**, using its two SFP interfaces for the redundant network connections.

A simplified installation could look like:



HSR Node → SFP A → ECU-P1522LPE → SFP B → HSR Node

The computer can therefore participate in the redundant HSR communication architecture, where frames travel in both directions around the HSR ring.

This is particularly interesting when adding industrial PCs for applications such as station monitoring, SCADA, data collection, protocol conversion or cybersecurity monitoring.

Connecting to an existing PRP network

The same card can instead be configured for **PRP operation**.

In a PRP architecture, its two SFP interfaces provide connections to the two independent networks:

PRP LAN A → SFP A → ECU-P1522LPE

PRP LAN B → SFP B → ECU-P1522LPE

The two LANs remain separated while the redundancy function is handled by the HSR/PRP interface.

What about a RedBox?

Another important part of an HSR/PRP architecture is the **RedBox – Redundancy Box**.

A RedBox is used when a device does **not natively support HSR or PRP**. The ordinary Ethernet device, often referred to as a **SAN (Singly Attached Node)**, connects to the RedBox, which provides the necessary redundancy functionality towards the HSR or PRP network.

A simplified HSR example would be:

Industrial PC → Ethernet → RedBox → HSR Ring

This is a very useful solution when existing equipment must be retained, but it also means adding another external device, additional cabling, power supply and installation space.

With an **ECU-P1522LPE installed directly in a compatible industrial computer**, the HSR/PRP functionality can instead reside inside the computer. This can eliminate the need for an external RedBox when the computer itself is intended to participate directly as a redundant node.

There are nevertheless applications where a RedBox remains the better architecture—for example, when several standard Ethernet devices need access to the redundant network, when the computer cannot accept a PCIe card, or when the redundancy boundary should deliberately be kept outside the computer.

Connecting HSR and PRP networks

RedBox functionality also becomes particularly important when integrating different redundancy domains.

For example, a substation architecture may contain an **HSR ring at process or bay level** while the station backbone uses **PRP**.

In such an architecture, an appropriate RedBox can provide the connection between the redundancy domains while preserving the required network redundancy.

This means the two concepts should not necessarily be seen as competitors:

ECU-P1522LPE – brings HSR/PRP functionality directly into the industrial computer.

RedBox – brings non-HSR/PRP equipment into the redundant network or provides an interface between different redundancy domains.

Together, they provide considerable flexibility when extending or modernising an existing IEC 61850 communication infrastructure.

Upgrade instead of replacing

For operators already using HSR or PRP, this opens an interesting possibility.

Rather than replacing an existing industrial computer simply because it lacks native redundant Ethernet connectivity, a compatible system with an available PCIe slot can potentially be upgraded with the ECU-P1522LPE.

For other equipment that cannot be upgraded internally, a RedBox can provide the interface to the redundant network.

The result is a flexible migration strategy where **existing equipment can be retained while HSR and PRP redundancy is introduced where it is needed.**

Recab can assist with the industrial computer, ECU-P1522LPE, SFP selection, RedBox and the overall HSR/PRP architecture for power automation and substation applications.

From HSR/PRP interface to a complete industrial computer

Adding HSR or PRP connectivity is only one part of building a reliable computer platform for power automation.

Recab can assist with the complete computer solution – not only the network interface. Based on the application and customer requirements, we can configure a complete industrial computer with the appropriate processor, memory, SSD/storage,

operating system and network interfaces, including the **Advantech ECU-P1522LPE for HSR/PRP connectivity**.

The solution can also be adapted with additional Ethernet interfaces, serial communication, fiber/SFP modules, PCIe expansion, 4G/5G connectivity and other application-specific hardware.

For customers with an existing computer platform, we can evaluate whether it can be upgraded with the ECU-P1522LPE.

For new projects, Recab can help select and configure a complete industrial computer designed around the application from the beginning.

This gives customers **one partner for the complete solution**, including:

- Industrial or embedded computer selection
- CPU, RAM and SSD configuration
- Windows IoT Enterprise LTSC or another required operating system
- HSR/PRP connectivity with Advantech ECU-P1522LPE
- RedBox solutions for equipment without native HSR/PRP support
- Suitable SFP transceivers and fiber interfaces
- Additional Ethernet, serial, 4G/5G and other communication interfaces
- Mechanical integration and application-specific configuration
- System testing and verification before delivery
- Local technical and commercial support from Recab

One complete solution from Recab

Instead of purchasing the computer, network interfaces, storage, operating system and redundancy components separately, **Recab can deliver a configured and tested industrial computer ready for integration into the customer's HSR/PRP environment.**

Whether the requirement is to **upgrade an existing computer, connect a standard Ethernet device through a RedBox, or design a completely new industrial computing platform**, Recab can assist from the initial specification through component selection, configuration and testing to the finished system.

The result: one configured computer, one solution and one point of contact – ready for the customer's application.

Do not hesitate to contact any in our sales team to discuss what solution that could best fit into your systems.

Contact us at: sales@recab.com

Webpage: www.recab.com

Datasheet ECU-P1522:

https://recab.com/wp-content/uploads/2026/09/ECU-P1522_DS07152420240717095313.pdf