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# Administration and configuration of communication SpaceWire network

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# SpaceWire overview

This standard was developed by an international group of experts coordinated by the European Space Research and Technology Centre (ESTEC) of the European Space Agency (ESA).

SpaceWire technology is assigned to make communication networks for on-board systems.

Maintained and developed by national space agencies:

- ESA (European Space Agency),
  - NASA (USA), JAXA (Япония)
  - RKA( Russian Federal Space Agency).
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# Overview Remote Memory Access Protocol (RMAP)

The remote memory access protocol (RMAP) has been designed to support a wide range of SpaceWire applications.

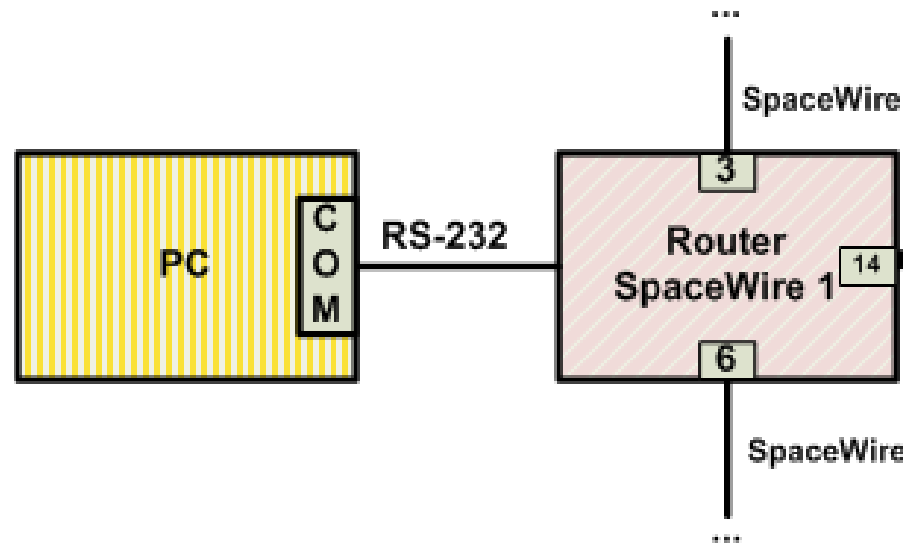
Its primary purpose, however, is to configure a SpaceWire network.

The RMAP protocol may operate alongside other transmission protocols running over SpaceWire.

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# Local administration and configuration

In most cases the configuration of the routers is made by using read-and-write commands to an available corresponding software router component.



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# Remote administration and configuration

Configuring a router in remote mode uses the remote memory access protocol (RMAP).

For remote configuration the administration software creates a RMAP packet, which sends the packet to a connected router from the PC through COM-port (USB or PCI), which then forwards this packet to a network according to the specified path address in the packet.

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# The automated process of network configuration and administration (Plug'n'Play) (1/4)

Under the Plug'n'Play technology it is generally understood that when all devices are connected, the devices with special algorithms will discover and determine the topology of a distributed system.

In this state working connections and disconnections of new devices are identified automatically.

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# The automated process of network configuration and administration (Plug'n'Play) (2/4)

All Plug'n'Play algorithms generally can be divided into 2 types:

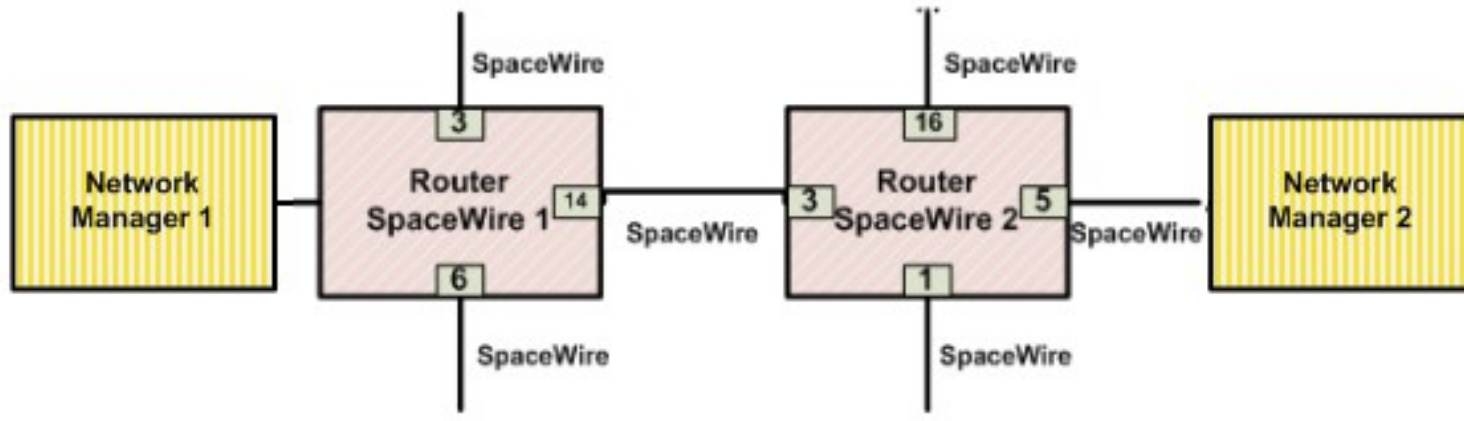
- Centralized. In this system there is only one device, which initiates and fully manages the Plug'n'Play process.
  - Decentralized. This system has several centers, which manage the Plug'n'Play process.
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# The automated process of network configuration and administration (Plug'n'Play) (3/4)

Figure illustrates both cases.

- If the algorithm is centralized then the network has only one center (Network Manager 1), which discovers the network.
- If the algorithm is decentralized, the network has two or more centers (Network Manager 1 and Network Manager 2).



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# The automated process of network configuration and administration (Plug'n'Play) (4/4)

- The different levels of the Plug'n'Play algorithms complexity should also be noted.
    - The creation of a universal algorithm is an extremely difficult task.
  - Plug'n'Play technology at this stage of development of the SpaceWire standard has not yet been standardized.
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# Conclusion

- Local configuration allows for the configuring router to be connected via COM-port to the computer.
- The remote configuration is implemented using remote memory access protocol (RMAP). By using this protocol there is no need to connect each router in network to a PC with running administration program on it.
- The automated configuration process (Plug'n'Play) doesn't required human intervention.
- The most convenient way is a combination of last two methods. That is, after determining the network, allow the user to configure network devices, if necessary. Thus the user is able to compensate the possibility of a suboptimal network configuration in an automated way.