

# SPINSAW – THE SPACEWIRE NETWORK SYSTEM ADMINISTRATOR WORKSTATION

**Session: Test & Verification**

**Short Paper**

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## **ABSTRACT**

SpiNSAW (SpaceWire Network System Administrator Workstation) is a software tool with GUI for setting of local and remote switch configuration. SpiNSAW can work in simple and in extended modes. In the simple mode the main switch components available for software are set, such as routing tables and links transmission speeds. In the extended mode you can set all the switch registers that are available for software. SpiNSAW can be used in a network with different types of a switch and nodes, it can be a useful means for network administration and for device testing during system and distributed algorithms developing.

## **1 INTRODUCTION**

An important task in SpaceWire interconnections is network switches administration. A user should have an opportunity to set any parameters of any switch in a network. For this task the software tool SpaceWire Network System Administrator Workstation (SpiNSAW) was built. This tool provides state monitoring and operating modes settings for SpaceWire switches in a SpaceWire network. SpiNSAW is an application with graphical user interface working on a PC. A switch can be either directly connected to the PC through the COM-port for performing read and writing operations of all switch components available for software by using direct connection to a switch or by the RMAP (Remote Memory Access Protocol). Both modes provide means for saving current settings of every switch in the SpaceWire interconnection network to a file and for downloading them back.

The main task of the SpiNSAW is the network administration, but it may be useful for devices testing in the network and for distributed algorithms testing.

## **2 SPINSAW OPERATING MODE**

The SpiNSAW can work in two different modes. One, simple mode is for users who would not like to know any details about switch internal structure. In this case only most important parameters could be set in quite a simple way: the SpaceWire switch routing table, transmission and receiving speed, and link ports' state. The example of the simple mode is shown on the Figure.

The second mode is an extended one and requires a user to understand the functions of the routing switch components that are accessible for software. It allows monitoring the current switches state in details, i.e. look the state of every channel, set transmission speed, determine adaptive group routing, send Time-codes and distributed interrupts, generate data packets and send them, monitor the error statistics, read/write configuration and operation mode registers of the switch.

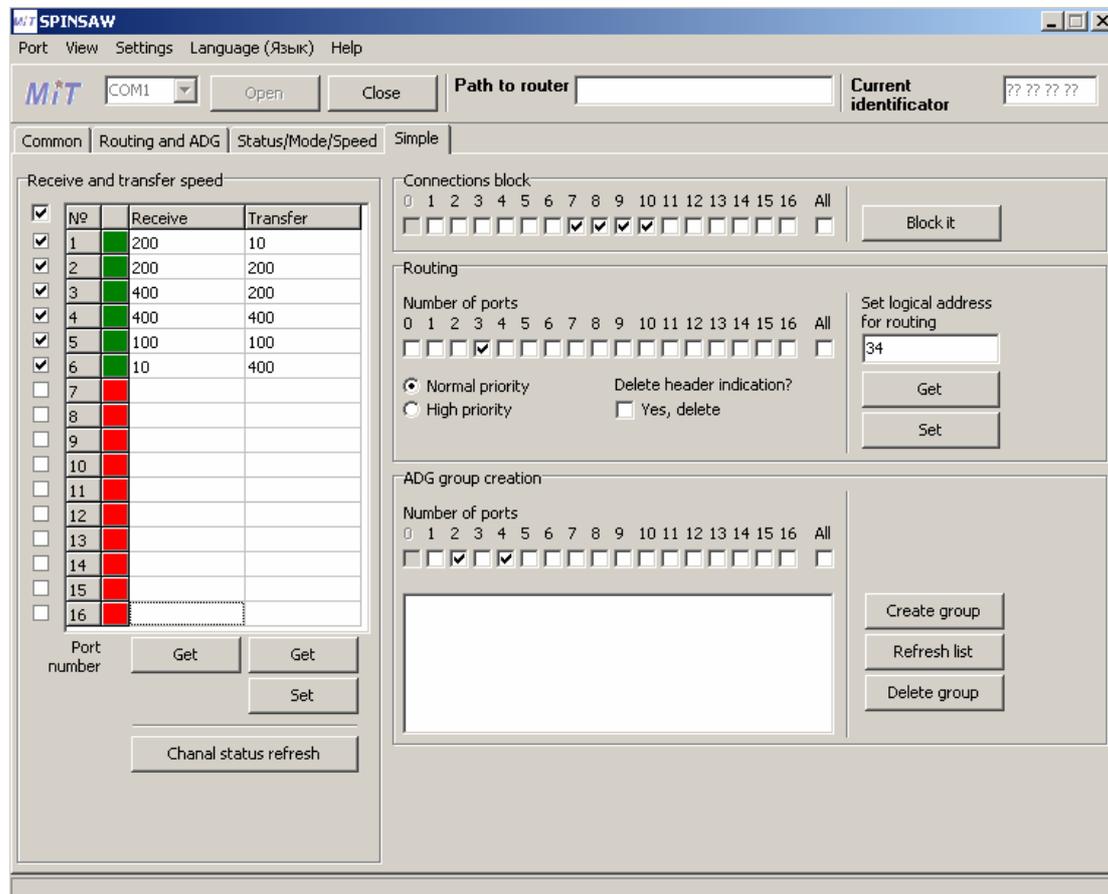


Figure. SpiNSAW simple operating mode

### 3 USING SPINSAW

#### 3.1 LOCAL SWITCH CONFIGURATION

In the simplest case the SpiNSAW can be used for configuration of one switch MCK01, which is connected to the PC by a COM-port. In this case SpiNSAW forms instructions according to user's operations in a certain format and sends them to the switch through the COM-port. Switch MCK01 processes such instructions, form answers on them and sent them back to the SpiNSAW.

#### 3.2 REMOTE SWITCH CONFIGURATION

To provide SpiNSAW access to the network several ways could be used. It depends on the devises' type that are used in the network.

The simplest way is when a switch, which has a special handler of instructions from the COM-port, is connected to the PC through the COM-port (for example, MCK01

switch). A remote configured switch must support processing of RMAP-packets and its address space distribution must be known. For other switches in the network it is sufficient that they transmit packets according to the SpaceWire standard. In this case configuration settings of the remote switch could be presented as a sequence of operations. By using SpiNSAW GUI the user specifies an instruction, for example sets the logic address in the routing table. According to the selected operation SpiNSAW forms an instruction in the form of a RMAP-packet. SpiNSAW sends RMAP-packet through the COM-port to the attached to the PC switch, which in turn sends it to the network. The RMAP-packet reaches the requested switch that processes it and sends a reply RMAP-packet. The directly connected to the PC switch receives this reply RMAP-packet and transmits it through the COM-port to the PC, where SpiNSAW is expecting it.

The SpiNSAW can be used also, with some limitations, if in the network there are switches with an unknown for SpiNSAW address space distribution.. At least one switch connected to the PC through the COM-port which can process messages from the SpiNSAW should be in the network. So the user can form RMAP-packet himself giving addresses, and SpiNSAW will send generated packet to the network and then receives an answer from the network.

In case the address space distribution of configured switch is known, but there is no switch connected to the PC through the COM-port the SpiNSAW also can be used. It is possible to use such off-the shelf devices as PCI-SpaceWire Bridge, USB brick, etc. In this case SpiNSAW forms RMAP-packet and transmits it to the software of the device which is used. The device software transmits it to the network through the SpaceWire channel. When reply RMAP-packet is received, the device's software should send it to the SpiNSAW for the further processing.

#### **4 CONCLUSION**

So SpiNSAW is a convenient tool for SpaceWire switches network administration. It makes possible to set switches' operating modes in the network and to control and monitor their state in a simple way. The SpiNSAW allows to send time-codes, distributed interrupts, RMAP-packets and data packets that can be convenient for distributed system work testing. SpiNSAW can be used for the network administration with different types of devices.