Extended Control Codes for Distributed Interrupts in *SpaceWire* Networks

Yuriy Sheynin, Sergey Gorbachev

St. Petersburg State University of Aerospace Instrumentation

Institute of High-Performance Computer and Network Technologies

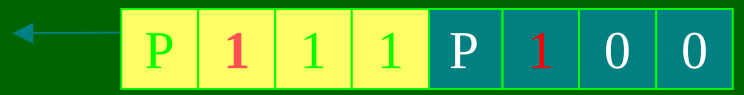
Sheynin@online.ru

Distributed Interrupts and Signals

"time-codes" extensions –

Usage of Control Flags (bits **T6** and **T7** of Time codes)

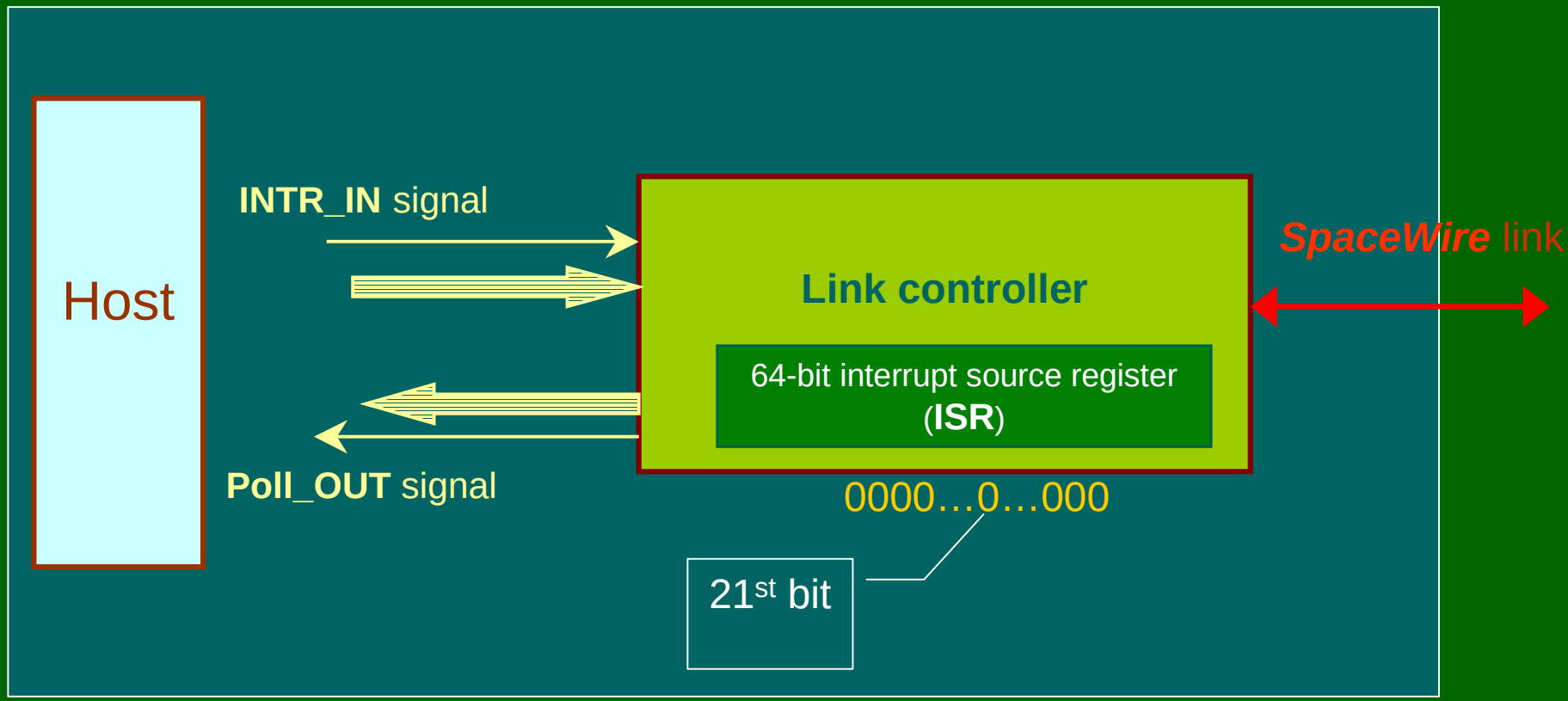
a) ESC+L-char



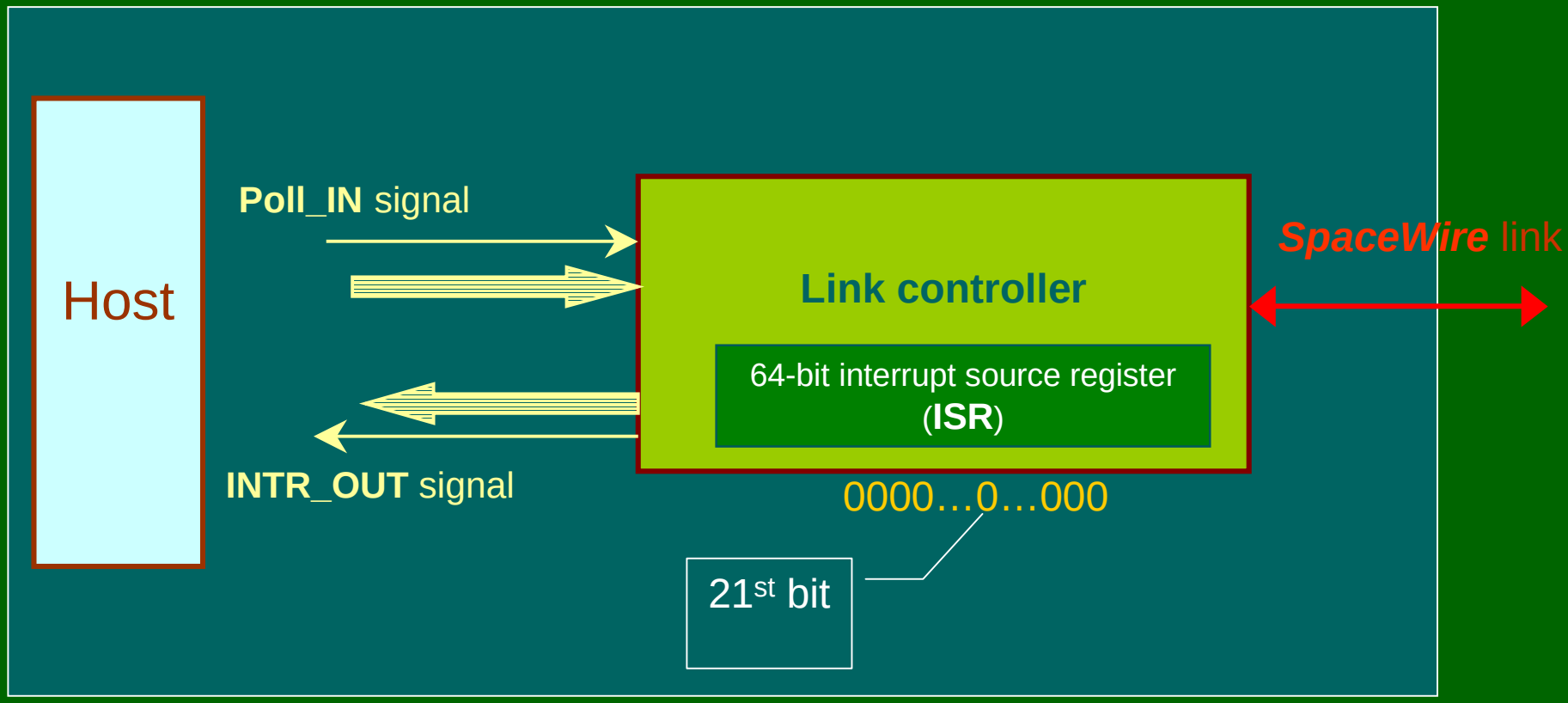
NULL=ESC+FCT

b) ESC + N-Char

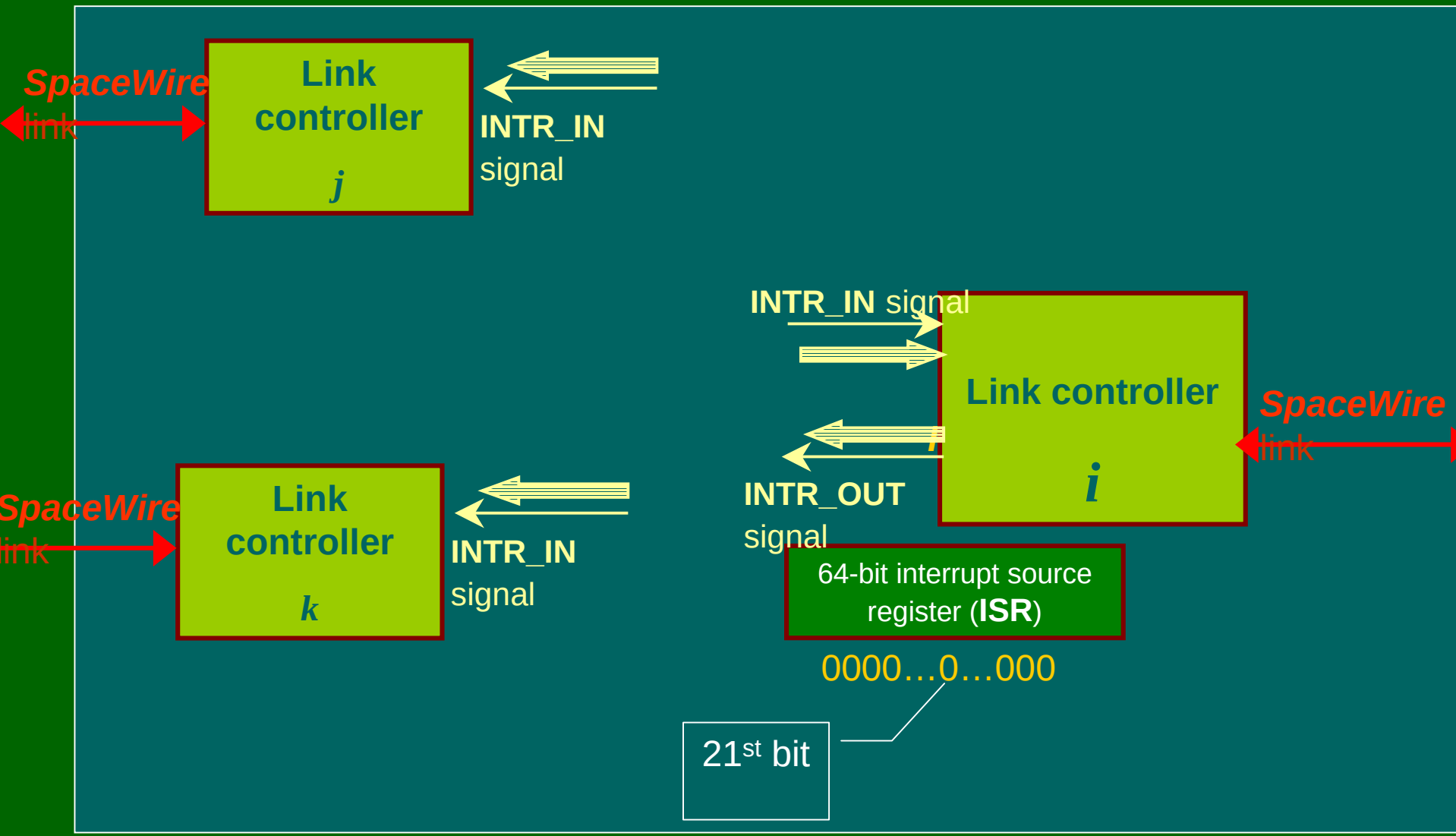
Interrupt-master node



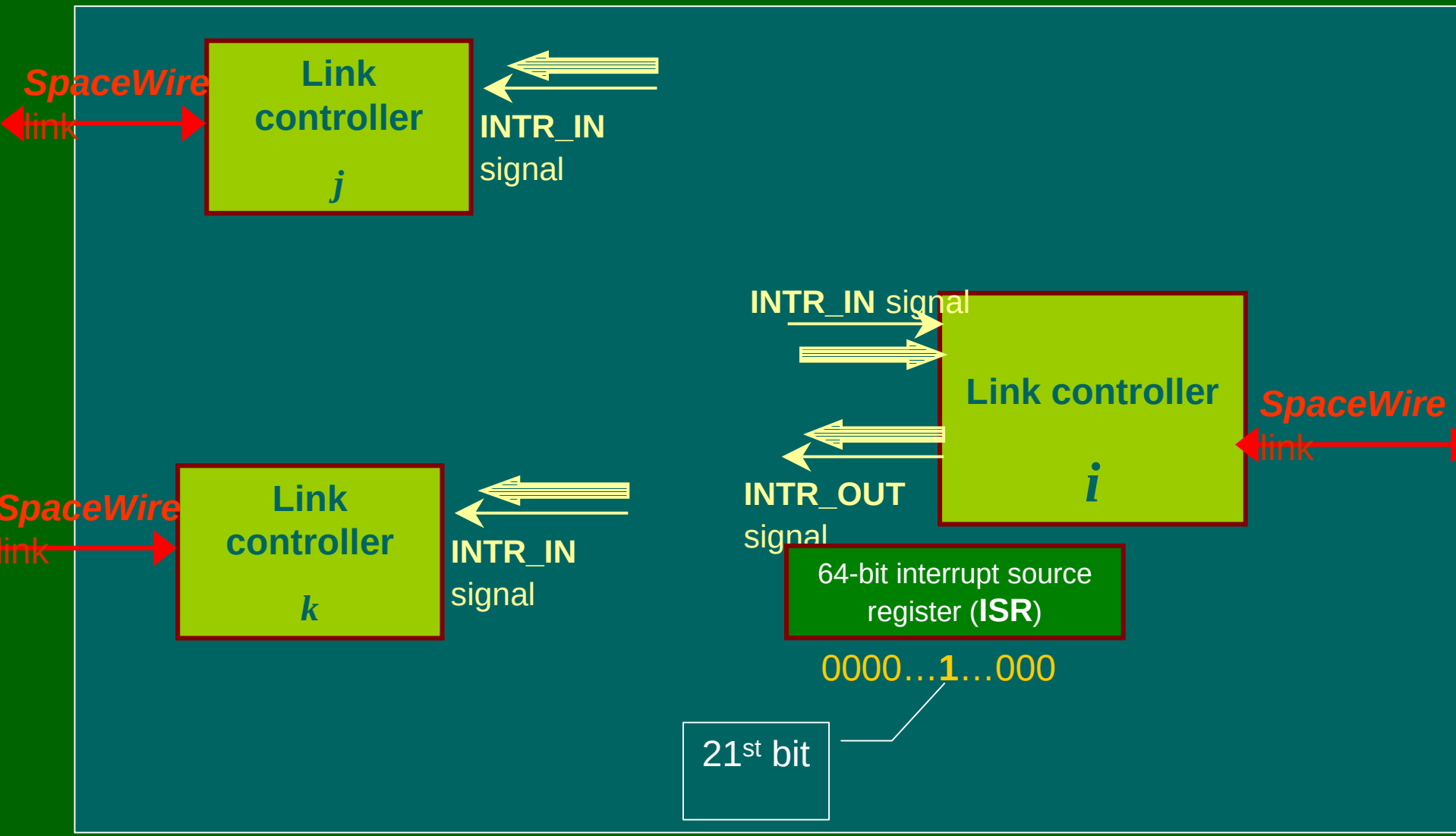
Interrupt-target node



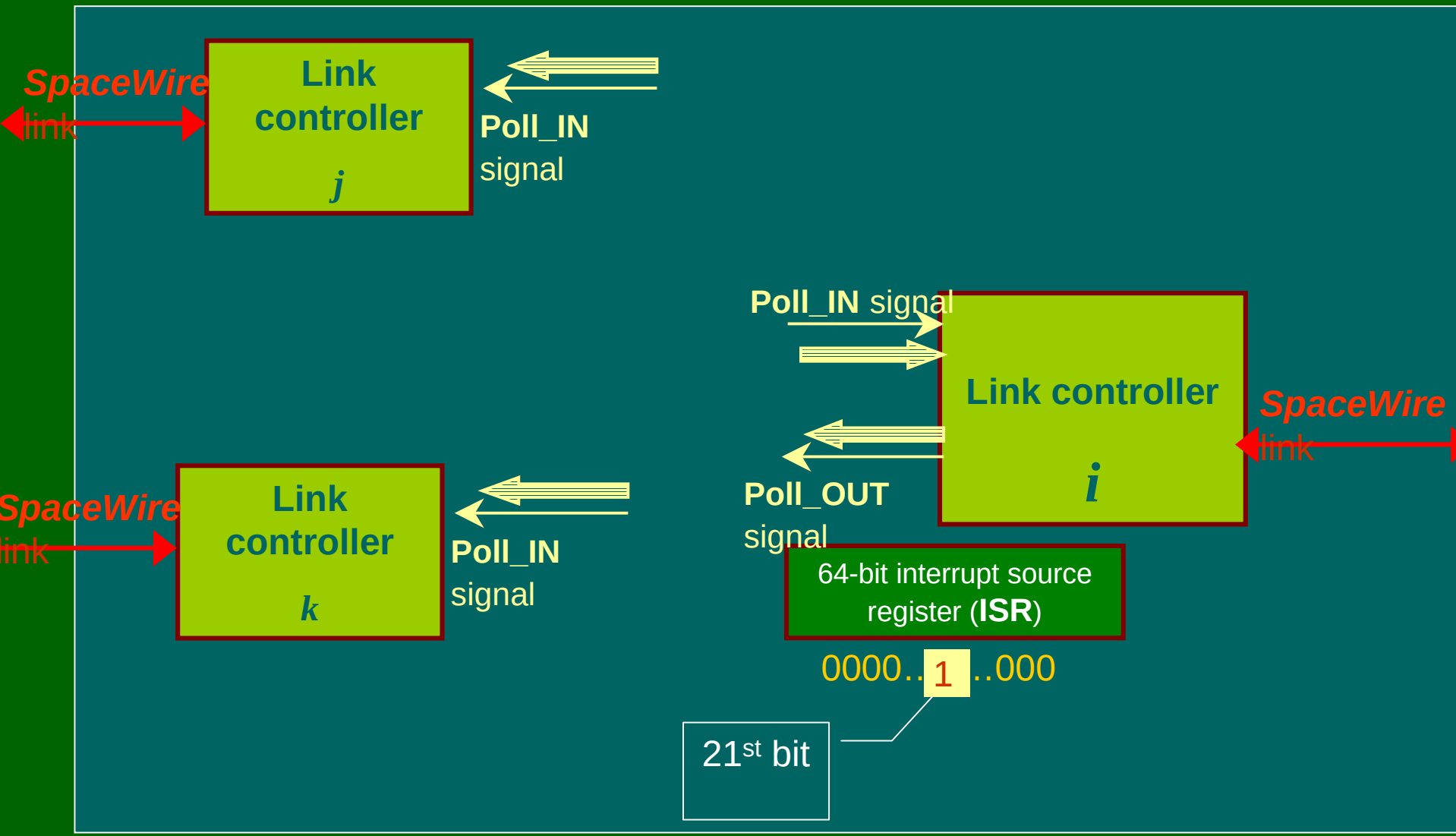
Interrupt code in a Router node (‘0’)



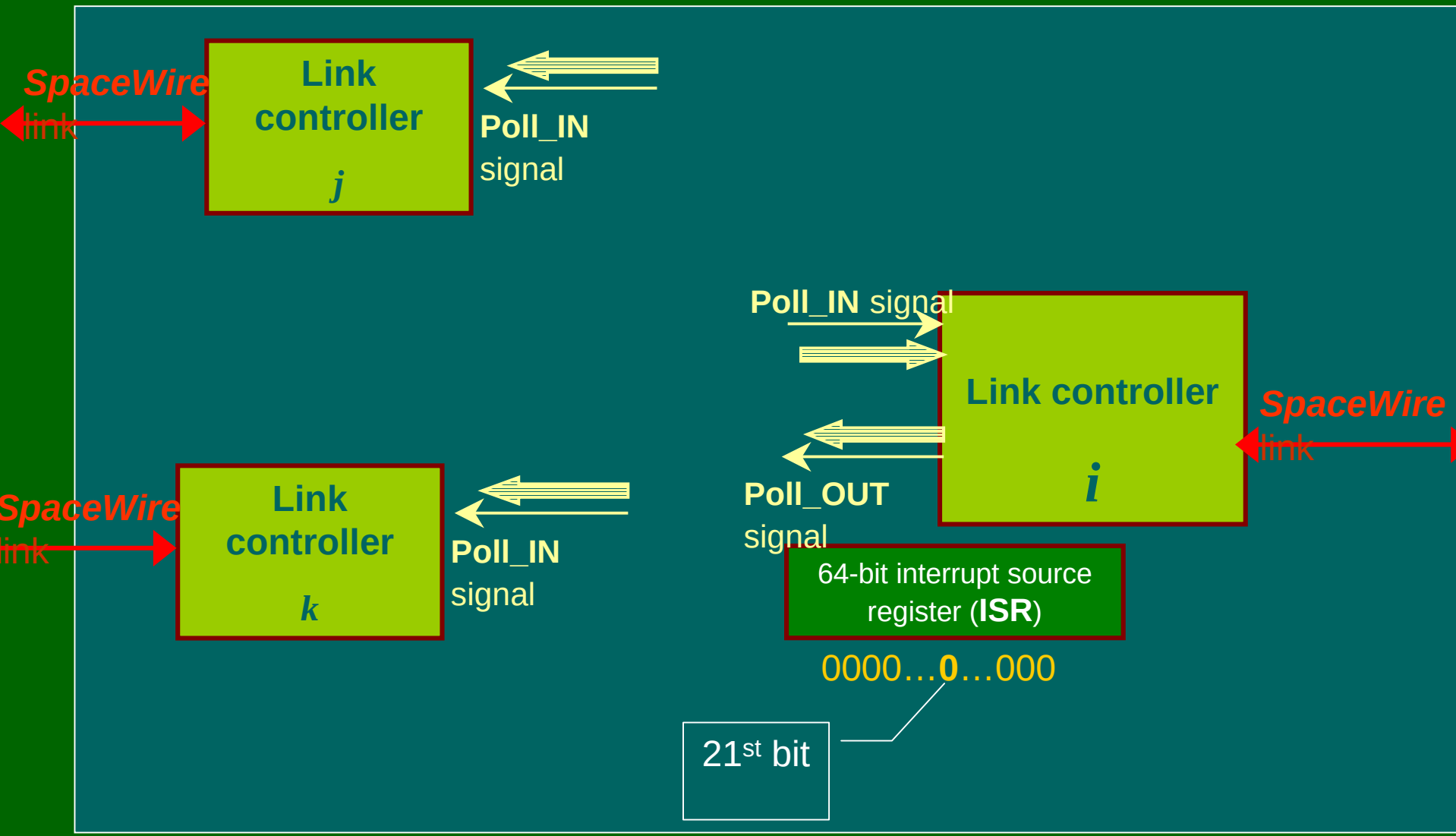
Interrupt code in a Router node (‘1’)



Poll code in a Router node (‘1’)



Poll code in a Router node (‘0’)



Some other issues

- Another Control code
  - Soft Reset ?
- Extend Logic Address space?

  221 nodes is not a lot!

RDMA Protocol draft remarks

- Overcomplicated a bit.

Main data transfer is thought to be done by “send-receive” message-passing

RDMA to be a good mean for interaction with low intelligence nodes

- RDMA access valid if and only the destination node has “registered” the address space area for RDMA access.
- Indirect Read and Indirect Write commands can be easily done by application layer

Protocol Identification remarks.

- Protocol identification is a good feature for SpW SnP.
- However a protocol identification byte inclusion in *every* packet increases overheads

  For small packet payload size, e.g. one 32-bit word, the PI inclusion will increase overheads from about 25% (1 byte Logical address for 4 payload bytes) to 50% (1 byte Logical address+ 1 byte PI for 4 payload bytes).
- It is important to keep low overheads as a SpaceWire competitive advantage.
- To have for the SpaceWire different modes of operation
  1. ***raw data stream***; gives maximum effective throughput of SpW links (unlimited packet length in the current SpaceWire standard accommodates this mode);
  2. ***raw SpW packets***, without any protocol identifier (admitted by current SpaceWire standard);
  3. ***protocol identified SpW packets***.

  Mode of operation can be bound to specific clusters of SpaceWire interconnection or to the virtual channels that are actually set by logical routing tables in SpW routers.