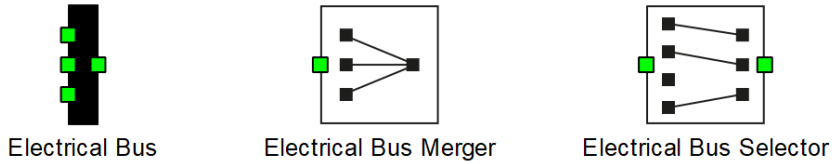
2023.4 Software Release Highlights

- **Electric buses and component vectorization**
- **Improved Schematic Editor user experience**
- **Communication interface upgrades**
  - Flexible Ethernet port selection
  - IEC 61850 SV - GPS time synchronization
  - SFP protocol upgrades
  - UDS over CAN protocol in HIL SCADA
  - EtherNET/IP protocol support (demo version)
- **Additional features**
  - Bidirectional AC-DC Converter
  - Switch-level oversampling in Boost Converter
  - HIL Connect Interface improvements

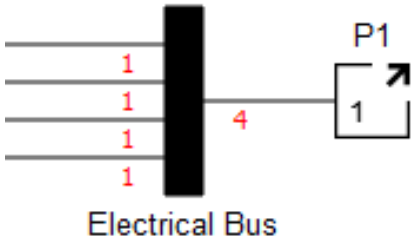
1.1 Electrical buses and component vectorization

Represent several wires or components with a single image

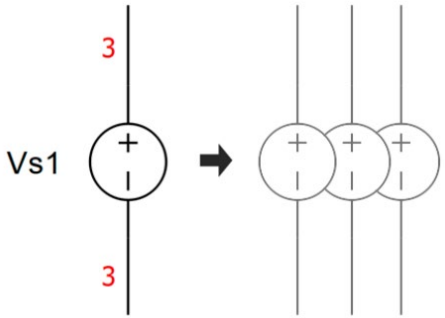
- New components
  - Electrical Bus
  - Electrical Bus Merger
  - Electrical Bus Selector

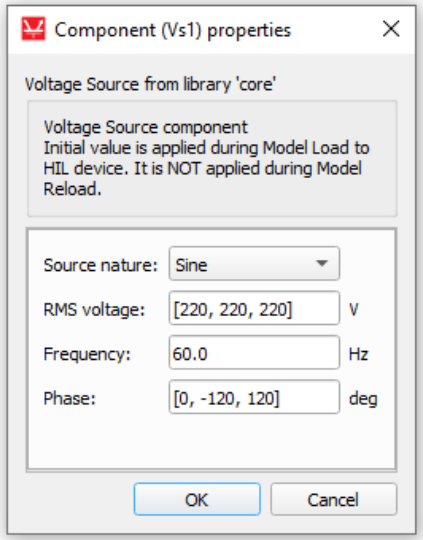


- Electrical terminals can now be multidimensional



- Vectorization support for select components:
  - Voltage Source, Current and Voltage Measurement, Passive elements, Ground...



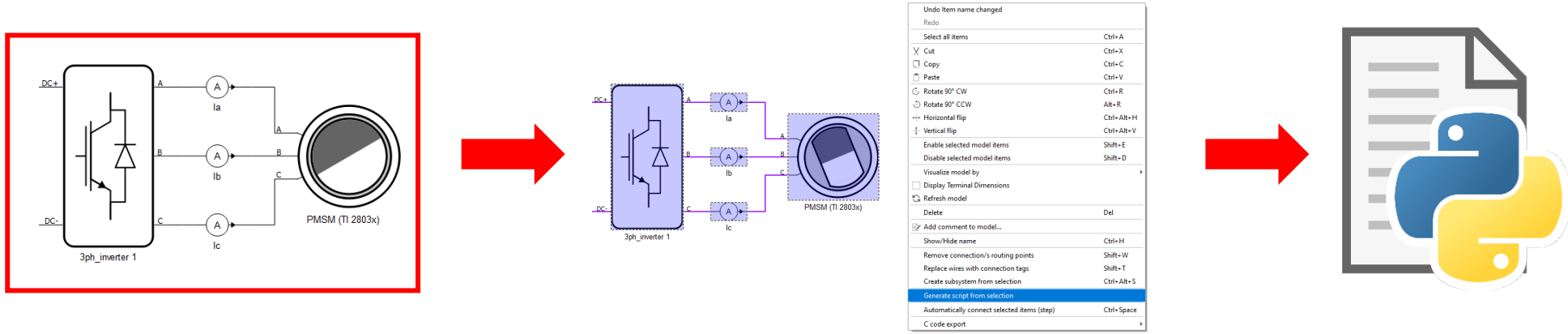


Read documentation

▪ 2.1 Improved Schematic Editor user experience

Modeling with Schematic Editor is now even easier

- ☐ Generate model building script from selection
  - ■ Directly generate API code to be used in test automation scripts and/or in component masks



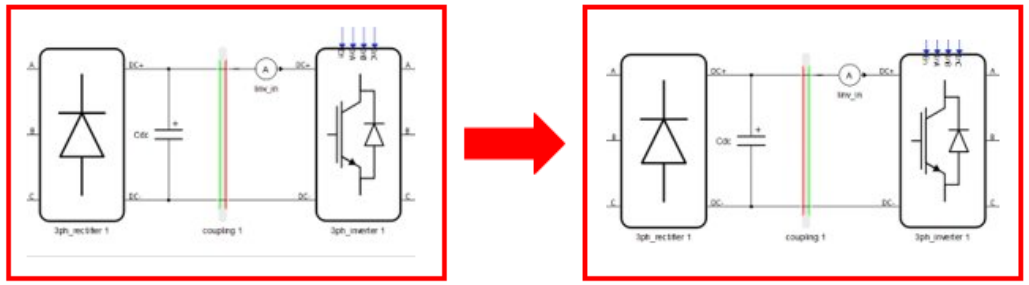
- ☐ Visibility improvements for better distinguishing power and signal processing part of the model
- ☐ Separate actions for enabling and disabling portions of the model
- ☐ Library UX unification between SE and SCADA
  - ■ Same actions
  - ■ Same naming

Typhoon HIL **Try them out!**

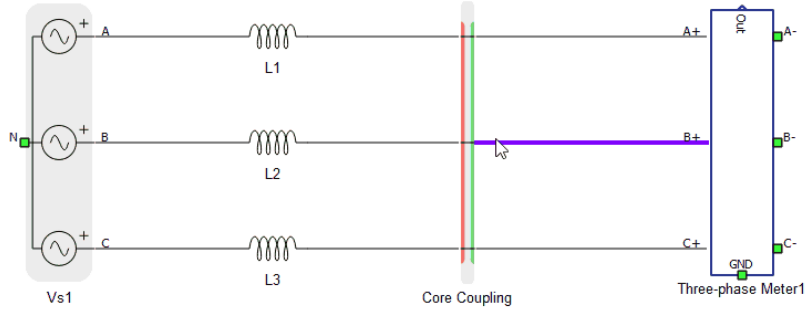
2.2 Improved Schematic Editor user experience

Automatic rewiring when flipping components

- When flipping a component, wires now automatically reconnect as intended



- Supports any component with a symmetrical number of ports on its sides

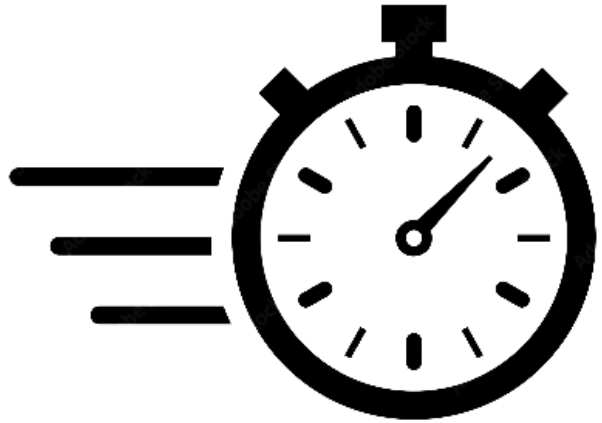


Try them out!

2.3 Improved Schematic Editor user experience

Faster model compilation

- Model compilation speed improved
  - Up to 50%
  - Most noticeable on large models
- General speed improvement 10 – 20%
- SW tests execution time cut by around 35%

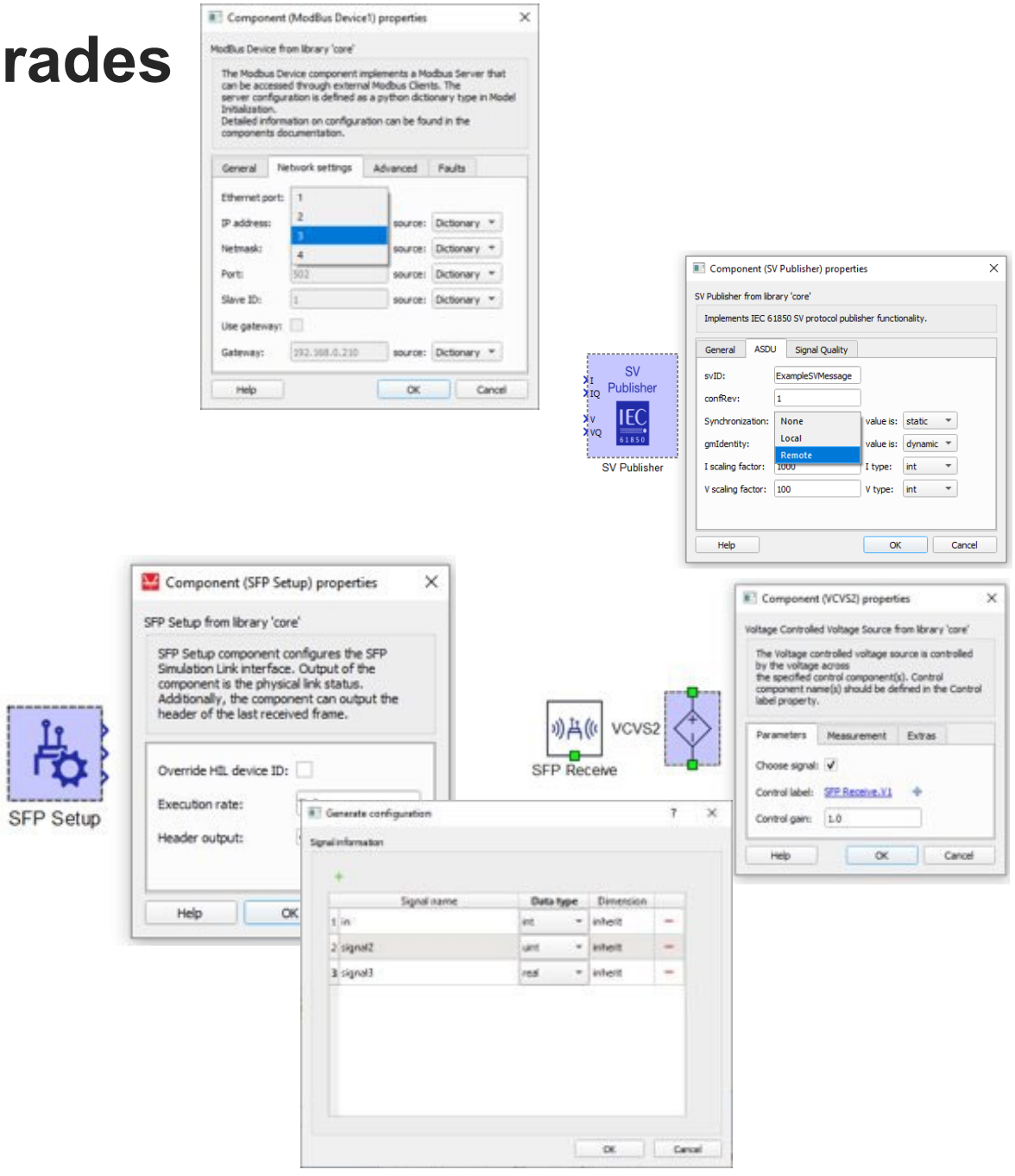


Try them out!

3.1 Communication interface upgrades

Do more with your communication components

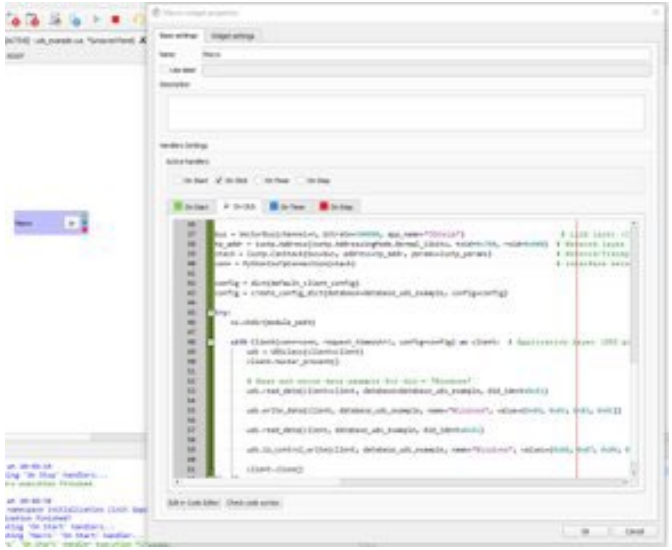
- Flexible Ethernet port selection
  - Modbus Device component can utilize any available Ethernet port
- IEC 61850 SV - GPS time synchronization
  - Option to synchronize sampling of Sample Values streams with GPS time
- SFP protocol upgrades
  - Configurable data type
  - Point-to-point link now has routable frames – SFP frame header can be output from SFP Setup component
  - SFP electrical signal available in source components



IEC 61850 SV time synchronization | SFP Simulation Link

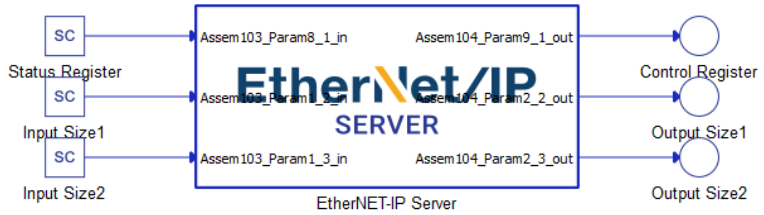
3.2 Communication interface upgrades

Expanded communication protocol support



- UDS over CAN protocol in HIL SCADA
  - Communicate with external automotive ECUs via Unified Diagnostic Services (UDS)
  - UDS client implemented via the Python library *udsoncan*
  - Parsing and importing of CDD files is done with the Python library *cantools*

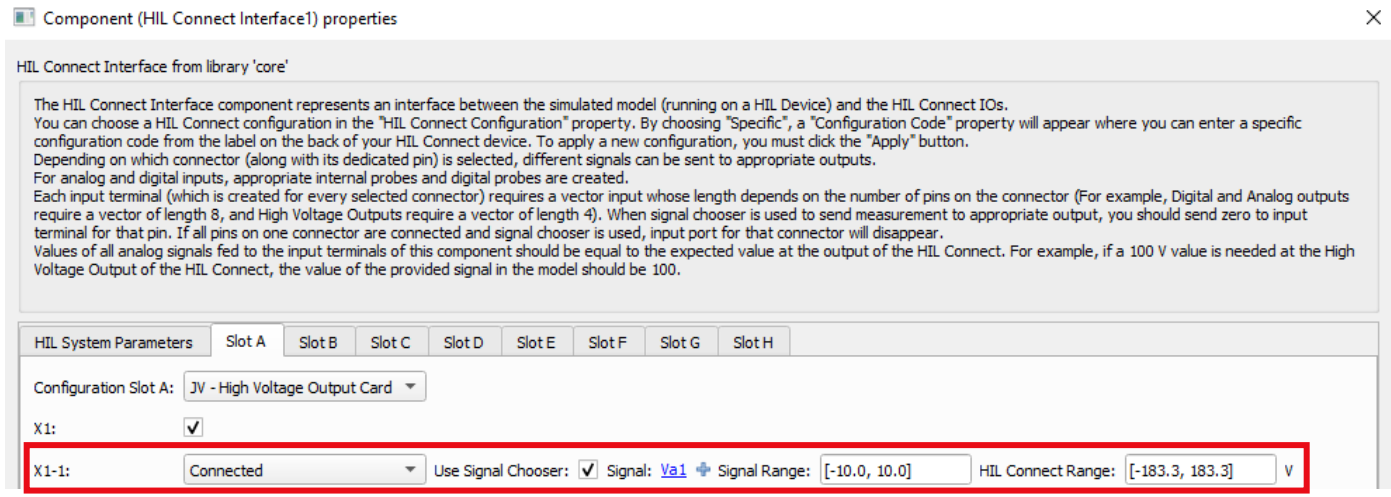
- EtherNET/IP protocol support (Demo version)
  - Implements Common Industrial Protocol (CIP) over Ethernet
  - Provides connection between industrial devices (sensors, actuators) and higher-level devices (controllers)
  - Support for implicit message transfer



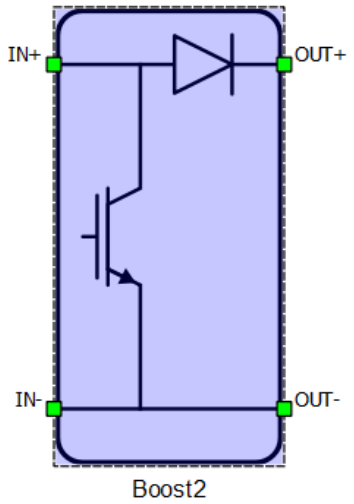
UDS over CAN FAQ | **EtherNet/IP documentation**

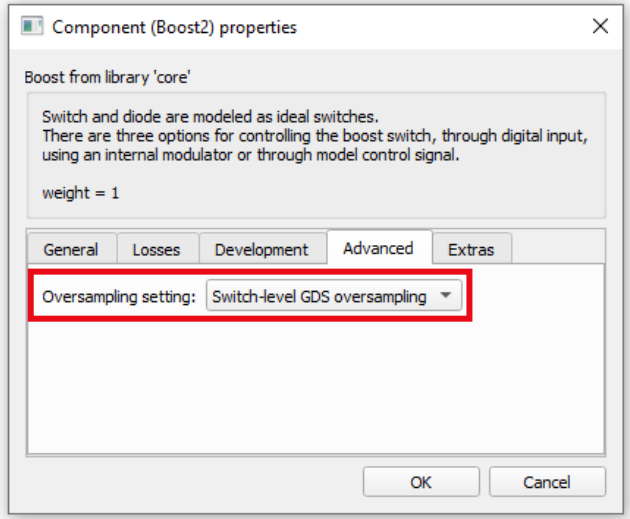
4.1 Other upgrades

- HIL Connect Interface improvements
  - FPGA signals are now directly accessible without signal processing down sampling
  - Signal scaling done automatically



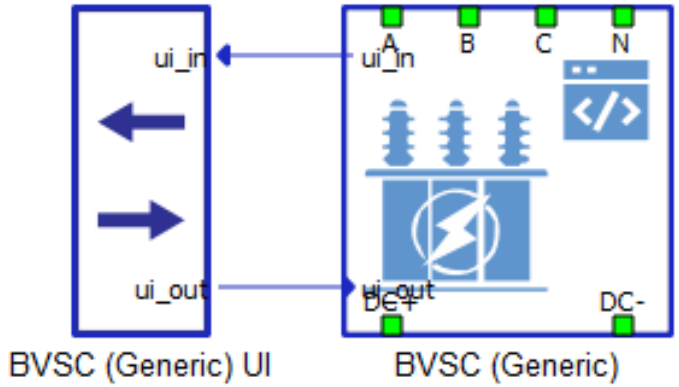
- Switch-level GDS oversampling in Boost Converter
  - Implementation on a component level
  - Higher fidelity of simulation results on higher switching frequencies
  - Compensation of all GDS transitions within one simulation step supported





4.2 Other upgrades

- Generic model of Bidirectional Voltage Source Converter (BVSC)
- Used with corresponding *BVSC (Generic) UI* block
- Has DC terminals for connecting external elements to DC link
- Operation modes: Grid Following, Droop, Isochronous
- Grid code functionalities: LVRT, VoltVAr, HzWatt, VoltWatt
- Protection functions: Over/Undervoltage, Overcurrent, and more...



Read documentation

Learn More

- Visit: https://www.typhoon-hil.com/products/2023-4-software-release
- Contact Us: info@typhoon-hil.com

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