

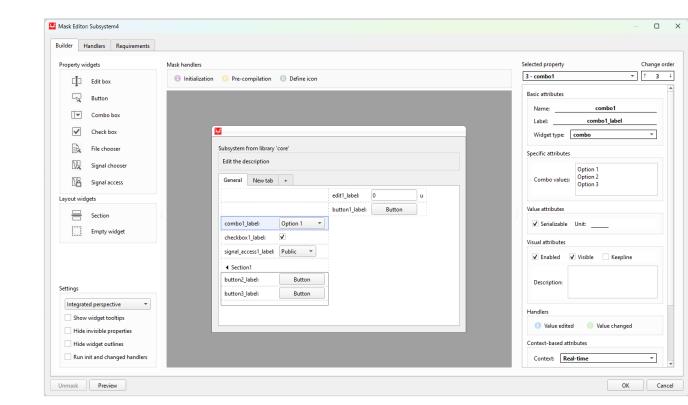
# 2025.1 Software Release Highlights

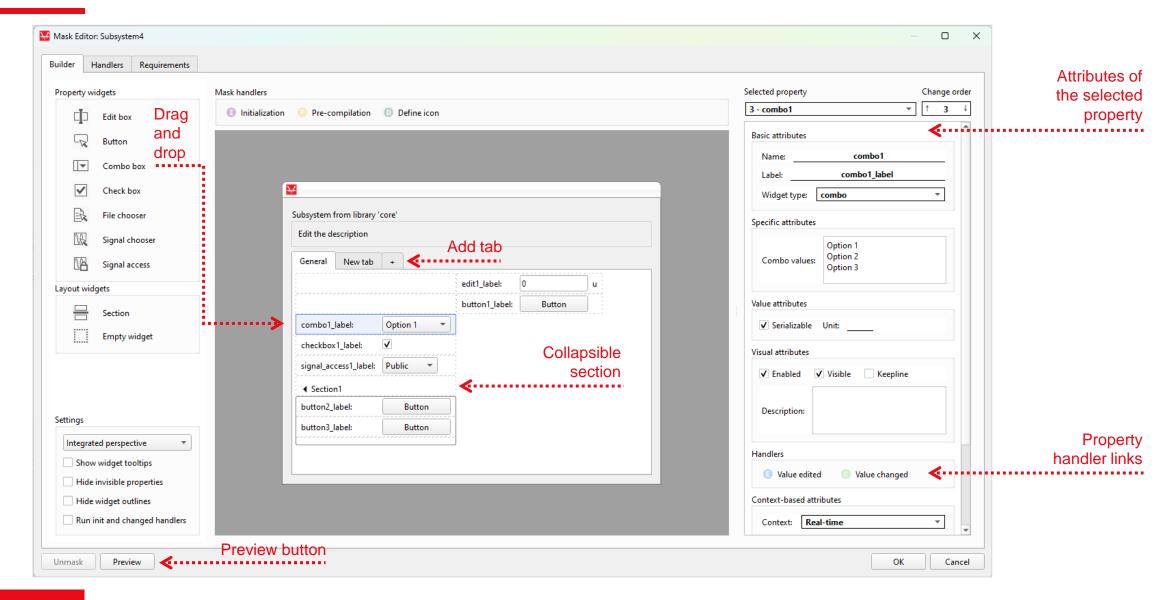
- □ New Mask Editor
- □ Flexible Ethernet Communication
- □ Automotive Communication Extender (ACE) Updates
- □ New components
  - Three Phase PMSM (Ansys ECE)
  - Phase Shifted Full Bridge converter
- □ Communication interface updates
- □ **Performance improvements**
- □ TyphoonSim updates

Typhoon HIL Control Center 2025.1	Typhoon HIL Control Center
	Control Center
	Version 2025.1 AREAN SUSP 4

Interactive mask design

- Create Masks with a new "what you see is what you get" interface
- □ New actions:
  - Drag and drop to add / move widgets and tabs
  - Edit labels, units and tab names inline
- □ New layout widgets:
  - Section
  - Empty widget (skip)
- □ New features:
  - Added property description and context-based attributes to the GUI
  - Matrix Editor for vector properties





See your changes right away

- □ Preview button
  - Quickly test dialog dynamics handlers
  - See the changes to your Mask before deploying it to your component
- □ New Handlers tab
  - Supports all mask handlers
  - Drag and drop from the containers list and from the namespace list
  - Quickly transition between the Property Handler editor and the property on the Mask Editor

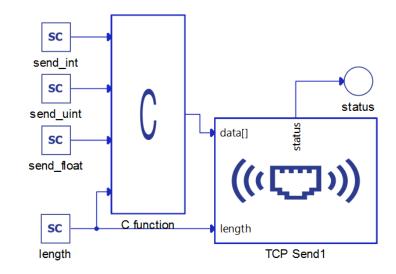
Section		<b>W</b>
Empty widget	Component (Subsystem1) properties X	
	Empty Subsystem from library 'core'	Empty Subsystem from library 'core'
	Edit the description	Edit the description
	General New tab	General New tab +
	edit1_label: 0 :	edit1_label: 0
	combo1_label: Option 1	combo1_label: Option 1 💌
	checkbox2_label: ✓	
		checkbox2_label: 🗸
	Close	· · · · · · · · · · · · · · · · · · ·
	1	
ettings		
Integrated perspective 🔻		
Show widget tooltips		
Hide invisible properties		
Hide invisible properties		
Hide widget outlines		
Hide widget outlines		

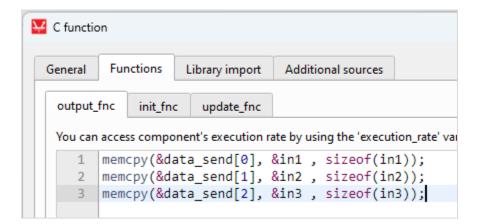
Builder Handlers	Requirements	modification flags	
Container General Mask Properties edit1 button1 combo1 checkbox1 signal_access1 button2 button3 edit2	Handler name Initialization* Pre-validation Pre-compilation Post-resolve Define icon Model loaded Post C code export Name changed Pre-copy Post-copy Pre-delete Before change Open Default dialog open Default dialog close All mask handlers	<pre>Container: Mask def init(mdl, item_handle):</pre>	Drag and drop as text

### **Flexible Ethernet Communication**

New TCP and UDP protocols for improving control of data exchange

- You can now implement your own protocols on our platform
- Choose between connection-oriented (TCP) and connectionless (UDP) communication based on project needs
- Support for multiple send/receive
   components with independent configurations
- Integration with third-party systems now made easier



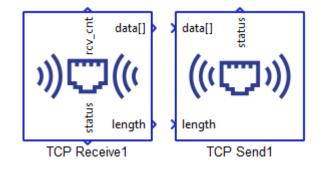


### **Flexible Ethernet Communication**

Ethernet TCP Communication

### $\Box$ New components:

- TCP Send: Initiates a connection and sends data (client role)
- TCP Receive: Listens for connections and receives data (server role)
- □ Key Features:
  - Reliable, connection-oriented protocol with three-way handshake (SYN, SYN-ACK, ACK)
  - Provides guaranteed packet delivery and error handling
  - Multiple instances possible with unique ports
  - Deterministic execution rate for real-time simulations
  - Supported by all HIL devices

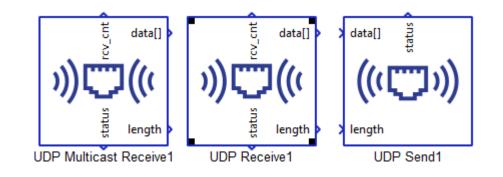


🔛 Component (TCP Send	Component (TCP Send1) properties							
TCP Send from library 'cor	ICP Send from library 'core'							
Receives data over Ether	Receives data over Ethernet port using TCP protocol.							
IP address:	192.168.0.100	Ethernet port:	2	•				
Netmask:	255.255.255.0							
Local send port:	55055							
Destination IP address:	192.168.0.1							
Destination port:	55000							
Execution rate:	100e-6							
Help		ОК		Cancel				

### **Flexible Ethernet Communication**

**Ethernet UDP Communication** 

- $\Box$  New components:
  - UDP Send: Sends data from the HIL device (client) to a remote server
  - UDP Receive: Receives data on the HIL device (server) from clients
  - UDP Multicast Receive: Listens for multicast messages from multiple senders.
- □ Key Features:
  - Simple, connectionless protocol using Lightweight IP (IwIP)
  - Supports multiple send/receive instances with different ports
  - Deterministic execution rate for real-time simulations
  - Supported by all HIL devices



DP Send from library 'col Receives data over Ether		)P unicast protoc	ol.	
IP address:	192.168.0.100	Ethernet port:	2	-
Netmask:	255.255.255.0			
Local send port:	55055			
Destination IP address:	192.168.0.1			
Destination port:	55000			
Execution rate:	100e-6			

## **Automotive Communication Extender (ACE) Updates**

Expanded communication interface for e-mobility applications

- ACE is a modular HIL Connect card designed to support various automotive communication protocols
- Ideal for e-mobility and BMS applications requiring multiple communication ports
- Compatible with all 3rd and 4th generation HIL devices

Interfaces
8x CAN/CAN FD
4x SPI
8x LIN
8x SENT
1x FlexRay



## **Automotive Communication Extender (ACE) Updates**

Easily manage SPI communication via your ACE card

- □ ACE SPI Setup component added
- Defines the SPI controller settings for the chosen ACE card
- SPI Slave component modified to support both HIL device and ACE-based SPI controllers
- □ SPI daisy chain communication available

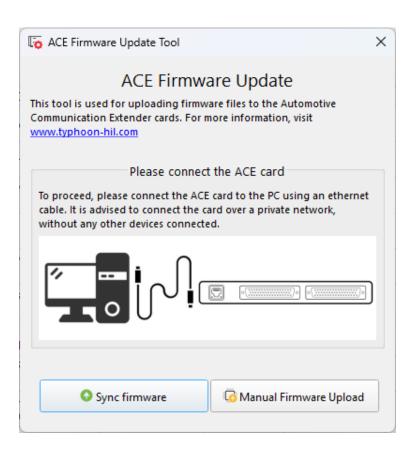


¥ Compone	ent (SP	I Slave1	l) prop	erties	5
SPI Slave fro	m libra	ary 'cor	e'		
Transmit da	ata usi	ng SPI I	PS thro	ough	GPIO por
General	Mes	sage	Regi	isters	
SPI contro	ller:	HIL G	PIO	•	
Execution	rate:	HIL GI ACE0			
SPI mode:		ACE0 ACE0			
MOSI pin:		ACE0 ACE1			
MISO pin:		ACE1 ACE1			
SCLK pin:		ACE1	- SPI4		
CS/SS pin:		4		•	

## **Automotive Communication Extender (ACE) Updates**

### Additional features

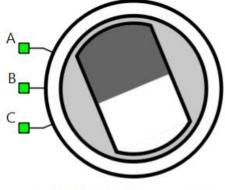
- □ ACE board firmware update from THCC
  - Direct Ethernet connection from PC to ACE board is mandatory
  - Flexible Ethernet port enabled for HIL506 and HIL606 devices – all ports except 1st are available
- □ Two firmware update options available
  - Update ACE firmware software will find the appropriate firmware and start the update process automatically
  - Upload ACE firmware software will ask you for the path to the desired firmware file that you want to upload to the card
- □ Additional button for accessing ACE documentation



### **Three Phase PMSM (Ansys ECE)**

New machine with ANSYS equivalent-circuit extraction compatibility

- □ Direct import of look-up tables from ANSYS Maxwell
- □ Electrical parameters directly calculated through ANSYS ECE data
- □ Allows for more accurate modelling of three phase PMSM



3 ph PMSM (Ansys ECE)

Component (ece) properties	AB_BasicData Version 1.0 Foles 8
Three Phase Permanent Magnet Synchronous Machine (Ansys ECE) from library 'core'	E_BasicData
Three Phase Permanent Magnet Synchronous Machine (Ansys ECE)         Electrical       Mechanical       Load       Feedback       Snubber       Output       Extras         ECE data file path:       ece_table.txt       Choose       Ece_table.txt       Choose	B_PhaseImp 3 PhaseA 1.000000000e-03 1.00000000e-06 PhaseB 1.000000000e-03 1.000000000e-06 PhaseC 1.000000000e-03 1.000000000e-06 E_PhaseImp B_Sweepings Id_Iq (21: -300 -270 -240 -210 -180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180 210 (21: -300 -270 -240 -210 -180 -150 -120 -90 -60 -30 0 30 60 90 120 150 180 210 Rotate (31: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 E_Sweepings
	B_OutputMatrix DQ0 B_OutputMatrix DQ0 0 -9.2961203328e-02 -3.0285060261e-01 1.8236174235e-02 -4.5980482338e+02 1 -1.0660580224e-01 -2.9968612885e-01 1.7454698709e-02 -4.0758122877e+02 2 -1.1130882248e-01 -2.9674541106e-01 1.4688500792e-02 -3.7573410058e+02

### **Phase-Shifted Full Bridge Converter**

New topology in our converter library

- A new ready-to-use block of a Phase-Shifted Full Bridge DC/DC Power Converter
- □ Relies on the switch-level oversampling mechanism
- □ Supports switching frequencies in the range of 100-150 kHz
- □ Reduced Output Voltage Ripple
  - Enables reduction of output capacitor
  - Lowers overall cost of the converter

Component (Phase-Sh	nifted Full Bridge)	properties					×				
hase Shifted Full Bridge 1	from library 'core'										
There are three options f internal modulator or th For real-time/VHIL simu	rough model con	trol signal.		-							
weight for real time sim	ulation = 3										
General Electrical	Development	Extras									
Control:	Digital inputs	•		_						_	
S1:	6 -		. (								
S2:	7 👻		N+ 📕	-				г	m	<u>m_</u>	OUT+
S3:	7 •		T	h	<u> </u>						
S4:	6 -		- 1	Γ¢	Б¢		r	чI			
Gate control enabling:			- 1	ЪЧ	чч	ŀ		$\neg$			
Sen:	5 -		- 1			ß					
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### **Communication interface updates**

Serial communication over DIO on all active devices

- Allows more flexibility by utilizing DIO as an access port for Serial communication
- Serial controller RX port is configured as DI pin
- Serial controller TX port is configured as DO pin:
  - HIL SCADA -> Model Settings -> Digital Outputs
  - Schematic Editor -> Output Settings -> Digital Outputs

	Component (Se	erial Setup) properties X							
	Serial Setup from library 'core'								
	The block defines common serial protocol settings.								
erial Setup	General Extra	as							
	Baud rate:	9600 💌							
	Data bits:	8 -							
	Parity:	None 🔻							
	Stop bits:	1 *							
	Execution rate:	100e-6							
	Access port:	DIO 👻							
	UART rx DI pin:	1 •							
		OK Cancel							

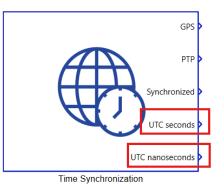
Serial

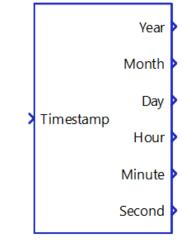
\$	General					×
Output Settings1	Analog Outputs	Digital Outputs				
	Name		Signal	Invert	SW Control	Remove
	1 DO1	▼ <mark>…al Setu</mark>	p.uart tx data 🔶		Enable 0	-
				rsign X Signal name gnal erial Setup int tx data		

### **Communication interface updates**

New UTC time synchronization components

- Current UTC time output from Time Synchronization component allows:
  - Time synchronization for testing time-sensitive systems and algorithms
  - Enables long-distance co-simulation
  - Provides a consistent time reference
  - Facilitates repeatable tests
  - Assists with accurately triggering and logging events
- UTC to date converter component added



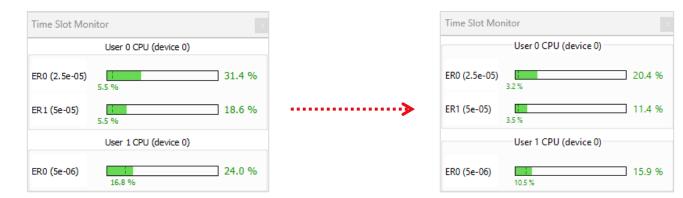


Timestamp To Datetime

### **Performance improvements**

Faster CPU-CPU data exchange

- □ Implemented Cache coherent data transfers between CPU cores
  - Data between CPU cores is exchanged via cache memory (cache-to-cache communication)
  - CPU cores are less burdened and inter CPU communication latency is reduced
- □ Result
  - Lower time slot utilization (typically 3% to 40% speed-up)
  - Especially affects models:
    - □ running on multiple User CPU cores
    - u with a lot of SCADA Inputs and Probes



### **Performance improvements**

Faster loading of user libraries

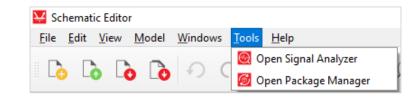
- Implemented per-file caching of Schematic
   Editor libraries
- □ Speeds-up loading of user libraries
  - Especially important during development of complex user libraries

💋 Package Manager			- 0 X
Installed Marketplace		Daufois	Install
Search	×	🟦 👔 👜 Danfoss MyDrive HIL	Download
AIT HIL Controller	Install latest	Author: Danfoss www.danfoss.com	Open release notes
Danfoss MyDrive HIL	Install latest	Version: 4.0.0 (latest)	
Energetic Macroscopic Representation	Install latest	Danfoss MyDrive® HIL supports three different Danfoss products: VLT® and iC7 Frequ iC7 System Modules, in the entire product range from hundreds to multi megawatts.	ency Converters and
EVSE generic with OCPP in SCADA	Install latest	A MyDrive® HIL setup includes one or more HIL compatible Danfoss control units and Simulator. Depending on which Danfoss product, the control unit includes a dedicated	
HIL Academy Course - Digital Control of Grid-Tied Converters	Install latest	this specific product and a variety of functional extension options, e.g., relays, digital an encoder/resolver feedback, line voltage measurement, and functional safety I/O.	id analog I/O,
[ 🛞 ] IEEE 34 node islanding with Artificial Neural Network	Install latest	The package includes a selection of different example models for both Frequency Conv Modules, e.g., industrial frequency converter, grid connected battery energy storage sy back-to-back inverters.	
The Machine Electrical Parameter Estimator	Install latest	NOTICE: Internet access is required during installation in order to download required p	ython packages.
OpenDSS and Typhoon HIL co-simulation	Install latest	Please see https://suite.mydrive.danfoss.com for ordering information and how-to vide	os.
0penDSS	Install latest		
Residential Energy	Install latest		
💶 🗢 TMS320F2808 Example Models	Install latest		
Хала Хусе	Install latest		
Help     Python environments     Second	kage actions *		

### TyphoonSim updates

Greatly expanded tool and library support

- Package Manager and Signal Analyzer now available in
   TyphoonSim Standalone
  - Ability to install packages (including upcoming TI Coder)
  - Ability to do post-inspection of captured signals
- □ Extended library support
  - All machines now supported
  - 4 new converters supported
  - Fuel Cell component supported
  - Support for losses calculation for MOSFET switches
- □ Relaxed Signal Processing validation
  - Execution rates no longer need be a multiple of the fastest rate
  - No limit on the number of different execution rates







# Thank you for your attention!







