

DIGITAL INDUSTRIES SOFTWARE

Simcenter SCADAS ES

Pulse and DAC Conditioning Units

Simcenter/SCES/PD/2026

Product Information Sheet

Summary

The following Simcenter SCADAS ES Unit(s) provide 4 semi-differential DAC output channels combined with 4 or 6 differential and single-ended digital pulse/tacho (or 2 incremental encoder) input channels. The DAC outputs can also be used as analog pulse/tacho inputs:

Code	Pulse/Tacho in		Channel supply		Analog out (Semi-diff)
	Digital	Analog	ICP	DC	DAC
SCES-PD4-L	6	4	✓	✓	4
SCES-PD4-B	4	4	✓		4

FEATURES

- 4x analog pulse/tacho channels with ICP® and DC supply (variable reluctance up to 400 Vpp)
- 4/6x digital pulse/tacho (or 2x incremental encoder) channels with DC supply
- Single-ended and differential coupling
- 4x Semi-Differential DAC outputs
- Available in different connectors: BNC or 4-pin LEMO (Simcenter SCADAS Mobile/Lab SYSCON/RV4 compatible)

BENEFITS

- High performance lab and mobile solutions
- Reliable high-speed, high-channel data acquisition
- Easy mounting and instrumentation
- Easy stacking of units without tools
- Centralized and distributed configurations
- Daisy chaining between stacks
- Use with Simcenter Testlab or with the on-board Simcenter SCADAS Go Configuration / Recorder (accessible through any web browser via PNI or PNU units)

Simcenter SCADAS ES Product Family

Simcenter SCADAS ES is a laboratory and mobile system, part of the Simcenter SCADAS signal conditioning and data acquisition systems family.

Simcenter SCADAS ES is both a distributed and centralized system for front-end signal conditioning and data acquisition hardware. Simcenter SCADAS ES is especially designed for high-performance lab and mobile solutions, reliable and high-speed throughput data acquisition, ideal for high-channel count testing.

Simcenter SCADAS ES Units are combined and stacked by a toolless mechanism, and come in 1 or 2 slot sizes. Some of them come in different connector flavours, normally indicated by its product code suffix.

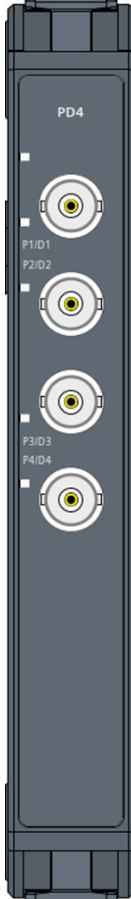
Each Simcenter SCADAS ES stack can deliver a total throughput up to 17 MSamples/s using 1 Gbps Ethernet ports via a Powered Network Interface Unit (PNI) or a Uninterruptible Power Network Interface Unit (PNU), and supports up to 8x slots of Conditioning Units and a REC unit.

Use Simcenter Testlab or the on-board Simcenter SCADAS Go Configuration and Simcenter SCADAS Go Recorder for instrumentation, channel setup, calibration, sensor validation, measurement control, on-line data viewing and after measurement.



Simcenter SCADAS ES Stack

Included Units

Simcenter SCADAS ES 4-ch PDAC Unit -L	Simcenter SCADAS ES 4-ch PDAC Unit -B
 Product Code SCES-PD4-L Description This SCES unit provides 4 semi-differential DAC output channels combined with 6 differential and single-ended digital pulse/tacho (or 2 incremental encoder) input channels via 4-pin LEMO compatible connectors in a single slot unit. The DAC outputs can also be used as differential analog pulse/tacho inputs. Supported sensors Analog pulse and tacho (variable reluctance up to 400 Vpp), digital pulse and tacho, incremental encoders, quadrature encoders. Features • 4x differential analog pulse/tacho with ICP[®] supply channels or 4x semi-differential DAC outputs • 6x differential and single-ended digital pulse/tacho channels with DC supply. (P1, P2, P3) and (P4, P5, P6) groups for 2x incremental encoder. Connectors – Mating cables included • 6x 4-pin LEMO (Simcenter SCADAS Mobile/Lab SYSCON/RV4 compatible) with 1x digital pulse/tacho input per channel (D1, D2, D3 and D4 are also analog pulse/tacho inputs, software switchable to analog outputs per channel) Size 1-slot Power input Via stack backbone Connectivity	 Product Code SCES-PD4-B Description This SCES unit provides 4 semi-differential DAC output channels combined with 4 differential and single-ended digital pulse/tacho (or 2 incremental encoder) input channels via BNC connectors in a single slot unit. The DAC outputs can be also used as differential analog pulse/tacho inputs. Supported sensors Analog pulse and tacho (variable reluctance up to 400 Vpp), digital pulse and tacho, incremental encoders, quadrature encoders. Features • 4x differential analog pulse/tacho with ICP[®] supply channels or 4x semi-differential DAC outputs • 4x differential and single-ended digital pulse/tacho channels without DC supply. (P1, P2) and (P4, P5) groups for 2x incremental encoder. Connectors • 4x BNC with 1x analog or digital pulse/tacho input per channel. Software switchable to 1x analog output per channel. Size 1-slot Power input Via stack backbone Connectivity Accessible in a Simcenter SCADAS ES stack via PNI or PNU units Grounding notes

Simcenter SCADAS ES 4-ch PDAC Unit -L		Simcenter SCADAS ES 4-ch PDAC Unit -B	
	Accessible in a Simcenter SCADAS ES stack via PNI or PNU units		The socket connectors outer conductors are not directly connected to unit chassis.

General

Each system may consist of one or more Simcenter SCADAS ES stacks and is based on Linux OS, providing connectivity and the on-board web app Simcenter SCADAS Go Configuration (or Simcenter SCADAS Go Recorder when a Recorder unit is present in the stack).

Data protocol	Ethernet based.
Backbone bus	Each unit shares this bus with power and data when stacked via backbone connector. • Input power • 1 Gbit Ethernet for data and control 48V DC distribution power • Clock reference signal • Real-time bus with low latency • Calibration and input channel diagnostics reference signal • System & Power control signals
Non-volatile memory	Configuration and channel settings stored in the unit.
Unit feedback	Following unit information is reported via LED and to the user interface: booting, upgrading, identification, internal error, active.
Grounding	Units in a stack have a provision for grounding from PNI or PNU via backbone.
Boot time	PNI or PNU will boot a stack of units within 3 min.
User interface	Via on-board Simcenter SCADAS Go Configuration / Recorder web application available in PNI and PNU units.
Dimensions	• Units come in 2 flavors: 1 slot or 2 slot units. • Dimensions when stacked [W x H x D]: ◦ 1 slot unit: 24 x 173 x 282 [mm]. ◦ 2 slot unit: 49 x 173 x 282 [mm]. NOTES: ▪ Width does not include 8 mm stacking feet ▪ Depth does not include front connector sockets
Weight	1 slot unit: 1.3 kg average. 2 slot unit: 2 kg average.
Stack calibration	Via dedicated CAL connector available in PNI and PNU units.

Clock synchronization

Clock source

Internal (PNI or PNU): generates the internal clock signal PTP for the backbone of the stack of units.

External: supports a present clock source in the backbone generated by another unit.

Clock accuracies

PTP (IEEE1588)	< 70 ns (when Sync-E is not supported in the network)
Sync-E + PTP	< 10 ns
GNSS	180 ns (typ, from another unit in the stack like REC)
IRIG-B	< 100 ns
NTP	< 1 ms (TBC)
Free running mode	< 5 ppm at 25 °C

Units Channels

General

All (conditioning) units are internally based on a sub-channel modularity, called channel group, usually a 3-channel group for analog conditioning units.

Pulse and tacho inputs

General

Conversion	Pulse signals can be converted to: • Frequency (RPM, speed, fuel flow ...) • Counter value up/down (distance, angle ...) • Tacho moments (needs Simcenter Testlab)
Count and rate output format	Count and rate converted signals are made available with these selectable sample rates: up to 3000 Hz (decimal grid), or 2560 Hz (binary grid).
Rate resolution	Linear with rate: 0.0014 % at 11200 pulses/s or 0.05 % at 400000 pulses/s.

Analog

This input can be switched by software to a DAC output.

Supported sensors/signals	Analog tacho (variable reluctance up to 400 V _{pp}).
Coupling	Differential (Semi-differential when ICP [®] supply is used)
Speed / Rate	Up to 40000 pulses/s
Oversampling factor	5 or more
Range	±20 V

Digital

A channel group of pulse inputs can be combined for incremental or quadrature encoders: P1+P2 without reference pulse or P1+P2+P3 with reference pulse.

Supported sensors/signals	- TTL pulses - HTL pulses: up to 15 V, single-ended and differential - Incremental encoders* - Quadrature encoders* - Signals RS-422, RS-485* (*) Available in future FW releases.
Coupling	Single-Ended and Differential
Speed / Rate	Up to 1000000 pulses/s (TTL, RS422)
	Up to 400000 pulses/s (HTL differential)
	Up to 200000 pulses/s (HTL single-ended)
Oversampling factor	5 or more (786.432 MHz internal clock)
Input specifications	TTL: $L \leq 0.8 \text{ V}$, $H \geq 2 \text{ V}$
	HTL single-ended: $L \leq 6 \text{ V}$, $H \geq 8 \text{ V}$
	HTL differential: $L \leq -0.9 \text{ V}$, $H \geq 0.9 \text{ V}$ ($0 \text{ V} \leq V_{\text{cm}} \leq 25 \text{ V}$)
	RS422/RS485 differential: $L \leq -0.2 \text{ V}$, $H \geq 0.2 \text{ V}$ ($-14.8 \text{ V} \leq V_{\text{cm}} \leq 14.8 \text{ V}$)
	Max level without damage: $\pm 32 \text{ V}$

Channel Supply

General

Protection provision

Short-circuit protected.

0 V or No Supply conditioning: $V_{\text{supply}+}$ (and $V_{\text{supply}-}$ when applicable) pins become floating (high impedance).

ICP

General

Low-noise and temperature super-stable supply (Siemens patent).

Modes	ICP [®] modes selectable by software per channel group. Values at 25 °C ambient temperature:	
	ICP [®] 4 mA mode	>4 mA, output voltage >23.6 V >2 mA, output voltage >24.3 V
	ICP [®] 3.5 mA mode*	>3.5 mA, output voltage >23.6 V >2 mA, output voltage >24.2 V

Channel supply specific feedback	Following information is also reported via LED per channel and in the user interface: • Open circuit (detection threshold >20 V) • Supply short (detection threshold <2 V)
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(*) Not available for analog pulse channels.

Analog pulse channel

Only supports ICP[®] 4 mA mode without AC coupling.

DC

Analog and digital pulse channel

Only if the connector is non-coaxial: Unipolar DC supply of 5 V ($\pm 10\%$) or 12 V ($\pm 10\%$) up to 300 mA is available per channel group (software selectable). When supply is turned on, possible inrush currents up to 400 mA are supported during 70 ms.

Analog outputs

General

Coupling	Semi-differential.
	The Semi-differential output supports single-ended inputs (amplifiers), while taking advantage of most differential signaling advantages via a smart low-resistive controlled path between negative output and signal ground.
Range	$\pm 10\text{ V}$
Drive	20 mA max (output impedance 50 Ω).
	Compatible with some headphone speakers for audio replay: Siemens headset ABH05 (600 Ω), Sennheiser HD600 (300 Ω).
D/A converter	24-bit at 204.8 kHz with interpolation filters: combination of analog reconstruction filters and digital interpolation filters with noise shaping.
Phase match	Inter-channel phase match is <0.2 ° at 10 kHz and <0.4 ° at 20 kHz.
Crosstalk	Always better than -106 dB.
	Method: -3 dB full-scale 1kHz sine from all other channels.
Protection provision	Short-circuit protected.
	Max capacitive load: up to 10m cable.

DAC

This input can be switched by software to an analog pulse input.

Bandwidth	40 kHz (-0.6 dB).
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	80 kHz (-3 dB) (TBC).
Signal generation	• Noise: Continuous band limited white noise with Gaussian distribution. • Pink noise: Continuous band limited pink noise. • DC: Typically used for status or calibration. • User defined* (throughput, streaming) • Sine: Defined by amplitude, frequency and phase • Sweep: Defined by start frequency, stop frequency, start phase, amplitude profile and sweep rate profile. Long duration. • Chirp: Defined by start frequency, stop frequency, start phase, amplitude profile and sweep rate profile. Short duration. • True random: a PSD shaped with time domain randomization applied to guarantee continuity of the signal. In practice the application delivers a time block to be time domain randomized by the HW. • Sine on random: Up to 16 sine tones (defined by amplitude profile, frequency, phase) on top of true random • Multi-Sweep: Up to 16 sine sweeps (defined by start frequency, stop frequency, start phase, amplitude profile and sweep rate profile) on top of true random. • Periodic random: Time block repeated multiple times without gaps between the blocks • Shock: Time block played one or multiple times based on repetition rate • Backbone signals (*) Available in future FW releases.
Signal to noise ratio (SNR)	Always better than 100 dB (20 kHz bandwidth). Method: 20 kHz bandwidth, AC RMS value at 22 °C, 1 s, 100 Ω termination.
Total Harmonic Distortion (THD)	Always better than -96 dB for all ranges. Method: -3 dB full-scale 1kHz sine.
Specific protection provision	Maximum accidental voltage without damage: ± 10 V. Output will not enable with offset voltages >2 mV, this ensures pop-free enabling. Both emergency and controlled shutdowns (in combination with PNU unit, software configurable): output will keep powered and carry out a shutdown for up to 10 s.

Environmental

Temperature range	• Operating: -20 °C to +55 °C (40 °F to 149 °F) • Storage: -40 °C to +85 °C (40 °F to 185 °F)
Ambient pressure	0.5 bar to 1.3 bar (50 kPa to 130 kPa) according to IEC 60068-2-13.

	Altitude: –2000 m (mining) to 5000 m (mountains).
Water and dust protection	IP20
Humidity	Resistant to humidity according to IEC 60068-2-30 (cyclic damp heat 12 h + 12 h).
Vibration	MIL-STD-810H, Method 514.8, category 24, 7.7 gRMS, 20-2000 Hz, 1 h per axis.
Shock	MIL-STD-810H, Method 516.8, Procedure I, Operational, Half-Sine pulse, 50 g, 11 ms.
Drop	MIL-STD-810H, Method 516.8 - Procedure IV: Transit Drop. Non-operational, Free fall from 122 cm height, unpackaged.
ESD	• EN61000-4-2 level 4 • ISO 10605
EMC requirements	IEC 61326-1
Calibration	Compliant with ISO 17025. Factory calibration of equipment with voltage channels in our ISO/IEC 17025 accredited calibration laboratory provides formal recognition to competent laboratories and provides a guaranteed & validated calibration method for Siemens SCADAS systems. Siemens will present a full ISO 17025 compliant report according to the accredited published scope and with the official RvA (registration number K159) & ILAC labels.
Certifications	CE, FCC

Connectors and Pinout

General

All connectors support at least 2500 mating cycles, unless specifically indicated.

Measurement

4-pin LEMO

Unit product codes	Connector	Pin function
SCES-PD4-L SCES-V6-PD2-C SCES-REC	 4-pin LEMO compatible (Simcenter SCADAS Mobile/Lab SYSCON/RV4) Socket : YCP-BWI06ACX-04FPCYX-000X Plug : (TBC)	1.GND 2.Vsupply+ 3.Vin-/DAC- 4.Vin+/ICP®/DAC+ Shielding: Unit chassis ground NOTES: For ICP® return and single ended analog/digital pulse signal ground, use Vin- pin. For DC supply signal ground, use GND pin.

BNC

Unit product codes	Connector	Pin function
SCES-V9-B SCES-VSD9-B SCES-PD4-B SCES-V6-PD2-B	 BNC	Inner: -As input: Vin+(SD)/SE/TEDS/ICP® -As output: DAC+ Outer: -As input: Vin-(SD)/GND(SE) -As output: DAC-

On-board Simcenter SCADAS Go Configuration / Recorder

General

License-free embedded software on the Simcenter SCADAS ES PNI and PNU units. If a Recorder is present in the stack, the application becomes Simcenter SCADAS Go Recorder.

Provides a multi-user parallel web user interface, accessible through any web browser, wired or wireless (PNU) connection.

Instrumentation

- Single channel setup
- Channel list (grid and card views)
- Persist settings on each connected unit
- Calculated channels setup
- Template management

Calibration & checks

- DC calibration
- Shunt calibration
- Offset balancing
- Verification checks

Monitoring

- Status info: health status, warnings and alarms
- Statistics: overall and instantaneous
- Time data
- Frequency data (FFT)
- Variety of customizable displays: digital, analog, strip chart, XY, 2D

Detailed info

See Simcenter SCADAS Go Configuration / Recorder Manual within the application.

Accessories

Delivered with units

Product code	Product name	SCES-PD4-L
SCM-CAS06*	SCM spare CAMAC-BNC adaptor for Tacho ch	6

(*) Compatible with Simcenter SCADAS Mobile/Recorder/Lab modules.

Optional

Product code	Product name	SCES-PD4-L
SCESA-CAB012*	PDAC(3x) to 10-pin Lemo RV4 comp. 1m	1

(*) Not yet available.