

CONTROL IP FOR THE 800 VDC SST ECOSYSTEM

QuietEdge for Solid-State Transformers

Three integration paths add observation, bounded response, and multi-module coordination while the OEM retains the primary regulator and independent protection.

The SST interface is taking shape. The behavior layer remains open.

OCP SST Specification Rev. 0.3.0 defines a black-box medium-voltage-to-800 VDC platform with 5 MW and 10 MW product classes, dynamic regulation, state-machine, redundancy, and communications expectations. OEMs remain free to choose the internal engineering solution. QuietEdge addresses the part customers experience after the power train is selected: how the system observes transitions, coordinates converter modules, contains faults, and recovers.

WHAT QUIETEDGE IS

Licensable control IP for SST conversion cells, downstream DC/DC blocks, and 800 VDC rack-power systems.

WHAT IT IS NOT

Not the medium-voltage power train, switchgear, magnetics, or product-certification owner.



OBSERVE

LOW-RISK ENTRY

- Reads existing voltage, current, ripple, phase, thermal, and trip telemetry.
- Produces a bounded activity score, operating mode, and event record.
- Changes observation and logging density only.
- Writes nothing to the power stage.

Commission faster. Capture transitions. Reduce stable-period data burden.



OPTIMIZE

GATED PERFORMANCE OPTION

- Adds an approved observer or small reference path after the review gate.
- Clamped, slew-limited, dwell-controlled, and runtime-disableable.
- Forced to zero on fault; no protection bypass.
- The baseline regulator remains primary.

Differentiate dynamic behavior without replacing the regulator.



COORDINATE

MULTI-MODULE AUTONOMY

- Uses module-local phase coordination through shared-bus behavior.
- Supports interleaving without a cabinet-wide timing reference.
- Enables hot-swap phase acquisition and automatic re-spacing.
- Coordinates local isolation and graceful rejoin.

Scale modular power without creating a new timing dependency.

1 OBSERVE

Read • compute • log
No actuation

2 OPTIMIZE

Bounded observer/reference path
Clamped • reversible • fault-to-zero

3 COORDINATE

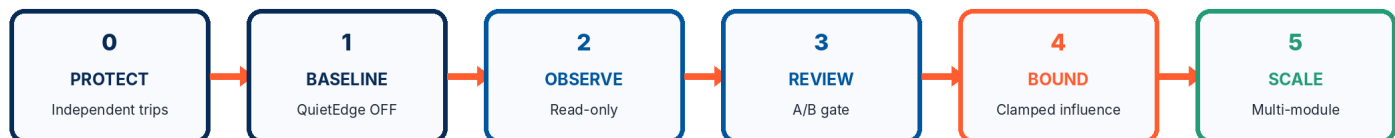
Multi-module phase coordination
Interleave • join/leave • recover

The OEM primary regulator and independent hardware protection remain authoritative at every stage.

Specification at a glance

Choose the authority level that matches the platform, validation stage, and risk posture.

Parameter	OBSERVE	OPTIMIZE	COORDINATE
Primary objective	Low-risk evaluation, commissioning, transition capture, and telemetry efficiency.	Add bounded, reversible differentiation to an existing controller.	Coordinate paralleled conversion cells or downstream power modules as a resilient ensemble.
Typical host	SST supervisory controller, converter controller, data logger, or sidecar MCU/DSP.	Existing SST or DC/DC control platform with an approved reference or diagnostic interface.	Modular converter cells, paralleled DAB/DC/DC blocks, or rack-side 800 VDC modules.
Inputs	V/I telemetry, ripple, phase command/error, temperature, fault/trip context, and timing markers.	Observe inputs plus the approved observer, probe, or reference-trim interface.	Local ripple/current/phase measurements, module state, join/leave status, and fault context.
Outputs	Activity score, stable/elevated/transition/fallback mode, intervals, event logs, and recommendations.	Bounded observer window/probe settings or small reference trim within defined clamps.	Interleave/phase state, join/rejoin behavior, re-spacing, and module-local coordination state.
Authority boundary	Read-only. No power-stage writes.	Primary-actuation-separated; clamped, slew-limited, reversible, and forced to zero on fault.	Module-local coordination remains inside independent hardware protection and OEM safety limits.
OEM retains	Power stage, primary regulator, protection, state-machine authority, compliance, and certification.	Same. QuietEdge does not bypass the regulator or trip chain.	Medium-voltage front end, power-transfer control, hard protection, packaging, and certification.
QuietEdge deliverables	Portable C core, telemetry adapter, register map, A/B procedure, and decision report.	Observe package plus bounds, interface specification, tuning support, and validation package.	Multi-module control stack, integration interfaces, test procedures, and pilot support.
Commercial form	Evaluation license plus porting/integration NRE.	Platform or field-of-use license, NRE, support, and production royalty.	Control-stack or build-to-print architecture license with per-unit or per-MW royalty.



No QuietEdge actuation before observer-only evidence passes formal review.

Designed for OCP-aligned SST development

- 800 VDC output behavior and dynamic-regulation evaluation.
- State-machine and transition observability.
- Distributed or block-redundant module architectures.
- SST/ESS coordination and load acceptance/rejection test support.
- Modbus TCP/IP telemetry mapping and auditable event records.

QuietEdge does not claim OCP certification. The partner product owns compliance, safety certification, and the medium-voltage power train.

Evidence & next step



- U.S. patent-pending modular DC architecture.
- Portable embedded implementation and registered interfaces.
- Measured 4.07–4.69 μ s control-code execution on TI AM2634.
- Staged 800 V DAB hardware validation underway.
- Simulation and technical-effect data available under NDA.

Execution timing is not a full power-system response measurement. Start with an observer-only evaluation on your platform.