



# LAYERZERO POWER SYSTEMS, INC.

The Foundation Layer

**Basic Meters**

Last Update: 5-15-2015 09:03:24 AM

Parameter	Units	Output	Input 1	Input 2
V <sub>Ln</sub>	Volts, RMS	117	115	115
V <sub>Ln</sub>	Volts, RMS	117	115	114
V <sub>Ln</sub>	Volts, RMS	117	115	115
I <sub>a</sub>	Amps, RMS/Peak	0 / 3	0 / 3	1 / 3
I <sub>b</sub>	Amps, RMS/Peak	2 / 3	0 / 3	2 / 3
I <sub>c</sub>	Amps, RMS/Peak	2 / 3	0 / 3	1 / 3
Frequency	Hz	60.0	60.0	60.0
Real Power	kW	0	0	0
Reactive Power	kVAR	0	0	0
Apparent Power	kVA	0	0	0
Power Factor		-0.15	0.89	0.37
Power Factor		1.0	3.3	1.7
Voltage THD	%	3.7	3.7	3.7
Current THD	%	188.8	124.5	447.8
Current Imbalance	%	52.4	11.5	11.1
Phase Rotation		ABC	ABC	ABC

Parameter Units Source 1-2  
Phase Angle Degrees 0

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 **zen** SSQM

Static Switch Quality Monitoring

## Zen SSQM Provides Advanced Power Quality Monitoring Capabilities

*Zen is being aware.* Zen SSQM is being aware of all activity in your critical power distribution systems. It is an all encompassing monitoring system with local and remote communications options. From basic monitoring & alarm reporting, to advanced power quality monitoring functionality, Zen SSQM provides a wide-range of options to help you be aware, be vigilant, be proactive in your quest to create a safe, stable and reliable operation.

### Zen SSQM Maximizes Infrastructure Awareness

Zen SSQM captures every millisecond of voltage and current, giving you a “Birds Eye” view of your entire critical power distribution infrastructure. Zen SSQM lets you know if a source has quality issues, if a UPS output is bad, or if there are any warnings or alarms. In addition, Zen SSQM empowers users with the capability to go back in time to retrace the exact sequence of historical events. No other tool in the mission-critical industry empowers users with this robust capability.



A 15" Color Touch Screen Permits Local Viewing Capabilities



Zen SSQM Data Can Be Accessed With a Standard Web Browser

### Zen SSQM Provides Answers

Zen SSQM provides timestamped pictures of waveforms before and after events, providing information that enables facilities to go back in time to methodically identify and correct the root causes of events. Zen SSQM actively captures power quality information at the STS, PDU, and RPP - permitting thorough post-event analysis.

Waveform captures of voltage and current for every pole of every circuit breaker are stored immediately before and after an event. Critical information is stored in battery backed non-volatile memory. The data is preserved in the event of a power loss.

### Zen SSQM Enables Auditing Even If Power Is Lost

LayerZero’s Zen SSQM Monitor provides a waveform capture (WFC) before and after an event. A battery located on the printed circuit board retains the data in the RAM if power to the System Control Board (SCB) is lost.

If an incident occurs, Zen SSQM captures all the data you need to determine the root cause:

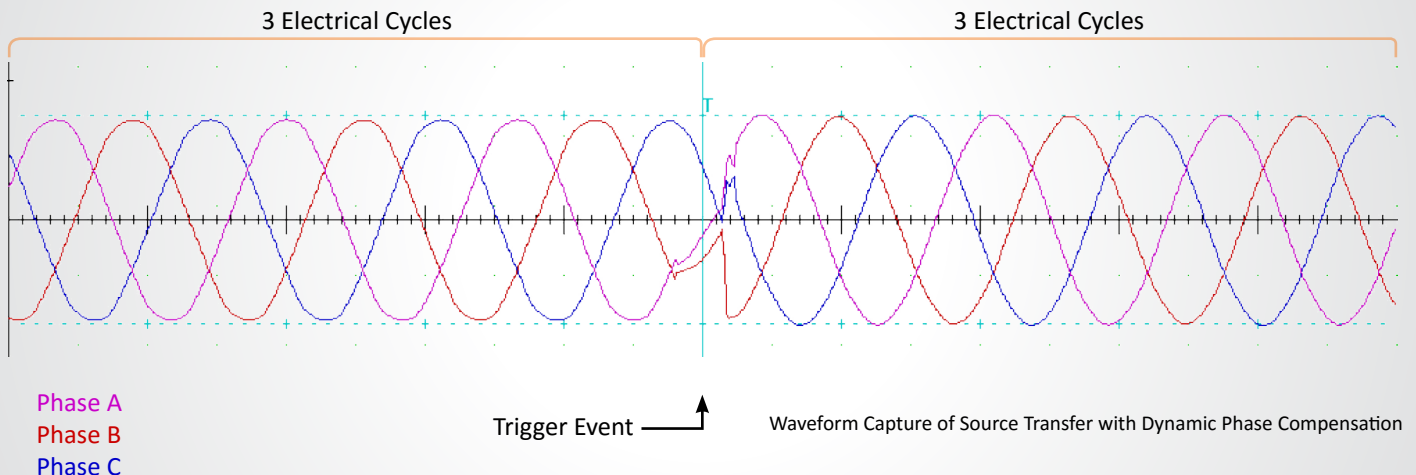
- Zen SSQM synchronizes its clock with an external reference via the network
- A WFC of voltage & current is captured before, during, and after the event
- WFC at PDU inputs & outputs, at RPP inputs, and at each branch CB output
- Waveforms can be analyzed to determine the root cause of events



Triple Modular Redundant System Control Boards

### Waveform Capture for Root Cause Analysis of Past Events

Zen SSQM captures 128 samples per cycle, and creates waveforms of voltage and current of all phases three cycles before and after events. Events include bus voltage anomalies, instantaneous bus overcurrent, and single sub-feed circuit overcurrent.

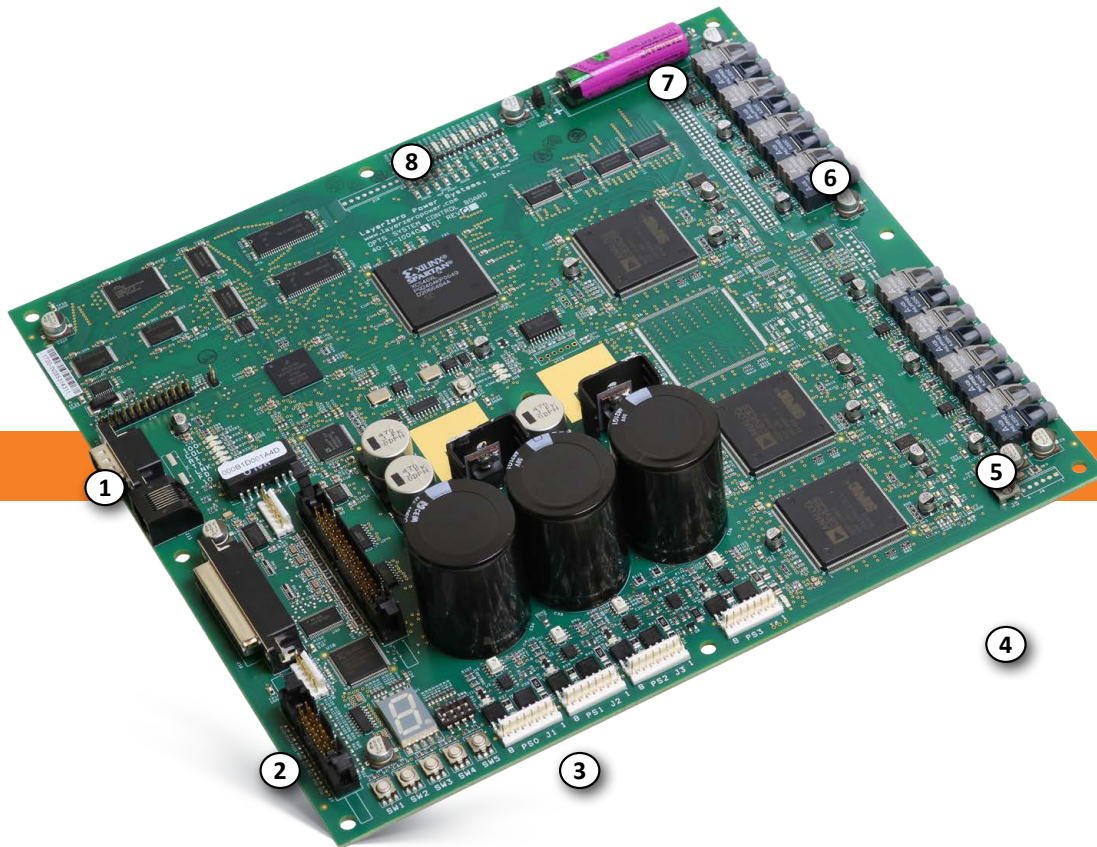


All product specifications are subject to change without notice.

Zen SSQM STS Monitoring Specifications		Zen SSQM ePODs Monitoring Specifications		
Voltage Inputs and Output	Mains	Voltage Meters 1 Per 2 Sides	Mains	Subfeed or Branch Circuits
Voltage (Volts)	✓	Voltage	✓	
Voltage Average of Phases (Volts)	✓	Frequency (Hertz)	✓	
Frequency (Hertz)	✓	Phase Rotation	✓	
Total Harmonic Distortion (Percent VTHD)	✓			
Phase Rotation	✓			
Current Inputs		Current Inputs		
Current (Amps)	✓	Current (Amps)	✓	✓
Current Average of Phases (Amps)	✓	Current Fraction of Fating (Percent)	✓	✓
Current Imbalance (Percent)	✓	Current Imbalance (Percent)	✓	✓
Real Power (kilowatts)	✓	Real Power (kilowatts)	✓	✓
Apparent Power (kilovolt-amperes)	✓	Apparent Power (kilovolt-amperes)	✓	✓
Reactive Power (kilovolt-amperes reactive)	✓	Reactive Power (kilovolt-amperes reactive)	✓	✓
Power Factor	✓	Power Factor	✓	✓
Crest Factor	✓	K Factor	✓	✓
Crest Factor Average of Phases	✓	Crest Factor	✓	✓
Phase Difference Between Sources	✓			
Phase Difference Between Sources and Output	✓			
Alarms		Alarms		
Summary Alarm	✓	Summary Alarm	✓	
On Source (1/2/3)	✓	Voltage (High, Low)	✓	
Source Fail (1/2/3)	✓	Overload	✓	
Source Preferred (1/2/3)	✓	Thermostat (High, Low)	✓	
Source 1st Alternate (1/2/3)	✓	THD Over Limit	✓	
Source Over/Under Voltage (1/2/3)	✓	Frequency (Over, Under)	✓	
Source Over/Under Frequency (1/2/3)	✓	I A/B/C K-Factor Over Limit	✓	
Source Not Available (1/2/3)	✓	Average K-Factor Over Limit	✓	
Output Failure	✓	Incorrect Phase Rotation	✓	
Source Overcurrent (1/2/3)	✓	Voltage Failure	✓	
Source Exceeds Manual Limit (1/2/3)	✓	I G1/G2 Over Ground Fault Limit	✓	
Source Exceeds Automatic Limit (1/2/3)	✓	I G1/G2 Over Ground Overcurrent Limit	✓	✓
Bypassed to Source (1/2/3)	✓	TVSS 1/2/3/4 Failure	✓	

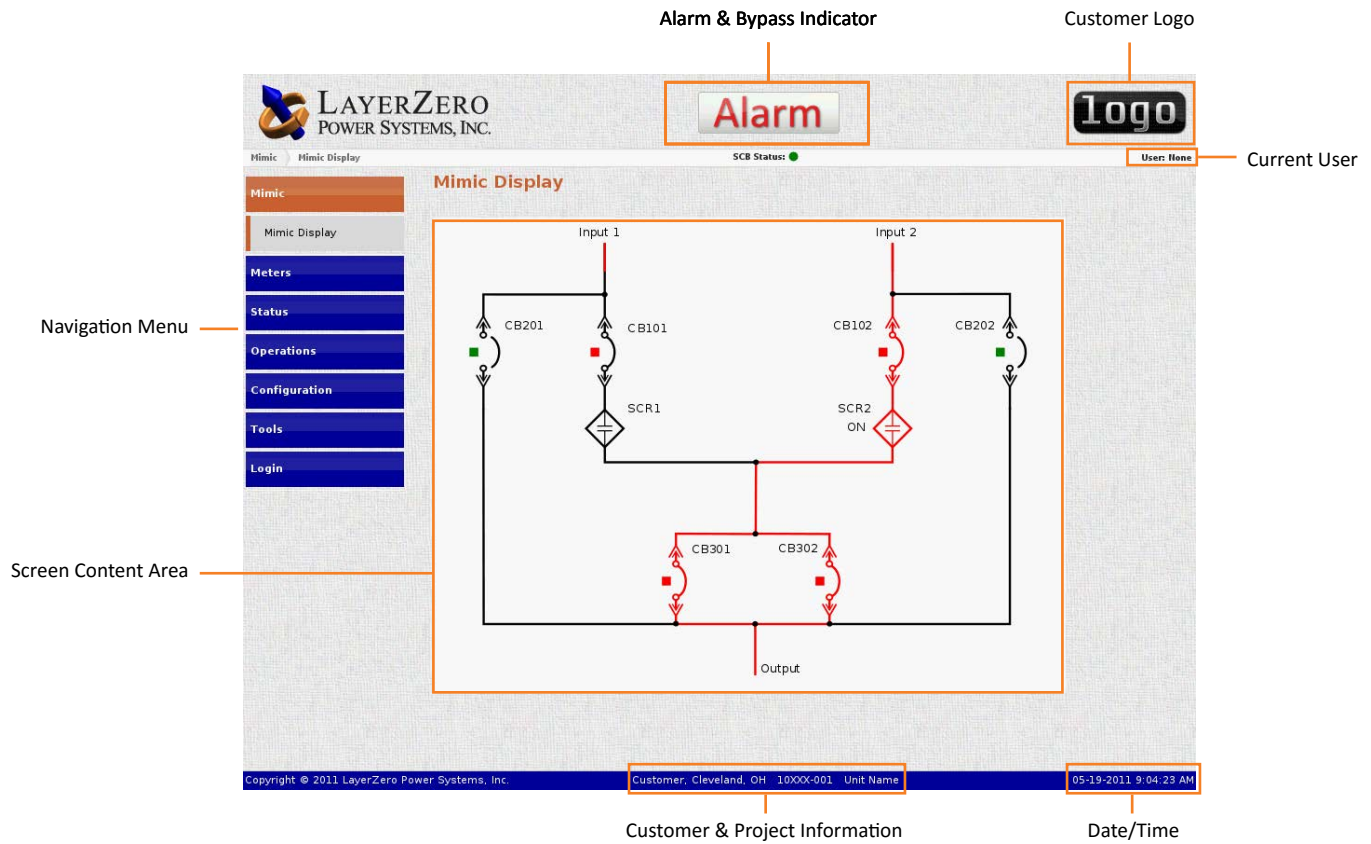
## Zen SSQM System Control Board Is A Dedicated Power Monitoring Ecosystem

The Zen SSQM System Control Board printed circuit board is designed specifically for power quality monitoring. Zen SSQM provides voltage & current inputs, communications ports, a built-in backup battery, and diagnostic LEDs. Zen SSQM SCB permits Triple Modular Redundancy (TMR), allowing for no single point of failure.

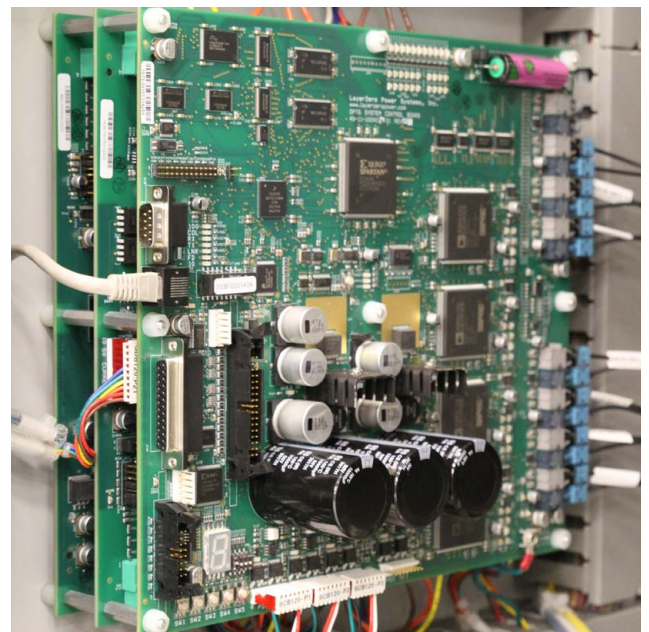


- 1. CAT5 (Ethernet) Port:** Connects to LAN Networks for Real-Time Power Monitoring
- 2. LED Indicator:** Provides Mode State Readout
- 3. Power Supplies:** Provides Power to SCB
- 4. Reset Button:** Resets the SCB
- 5. Fiber Optic Connections:** Facilitates Communication with Gate Drives
- 6. Fiber Optic Connections:** Facilitates Communication with Gate Drives
- 7. Battery Backup for Data Storage:** Saves Information in Non-Volatile Memory
- 8. Diagnostic LEDs:** Provides Diagnostic Capabilities

### GUI Overview

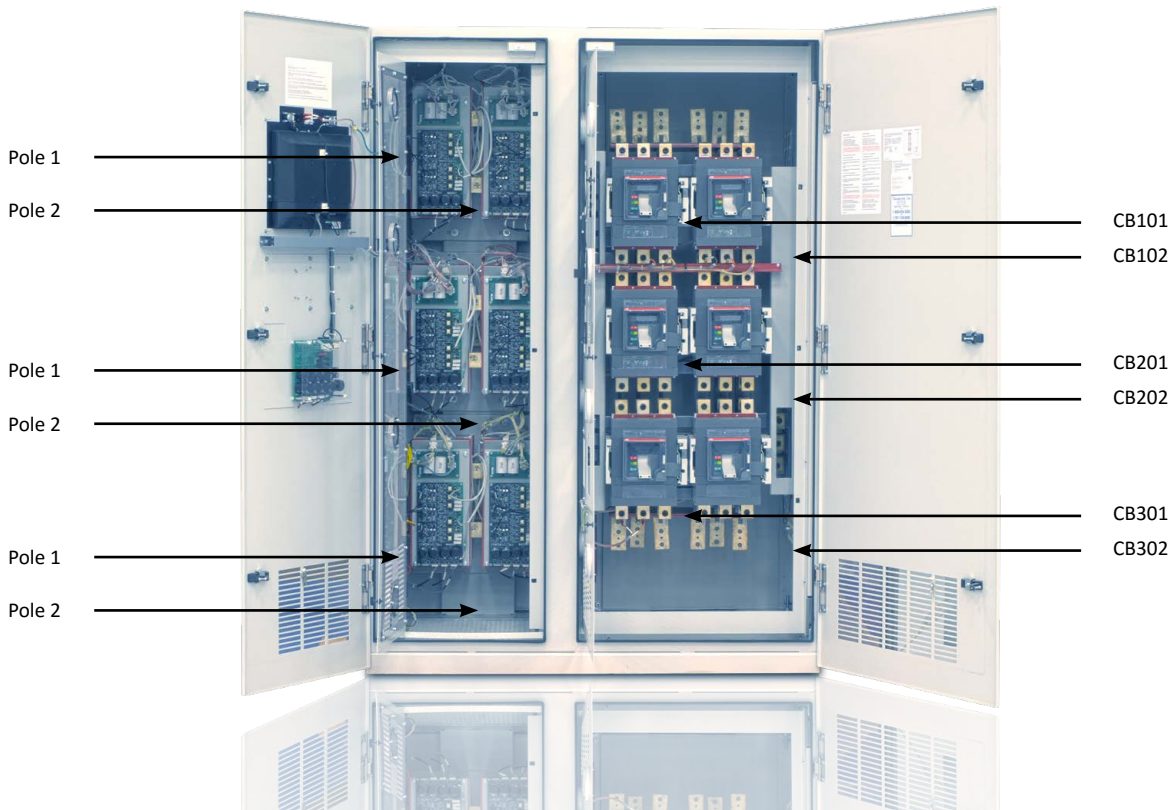
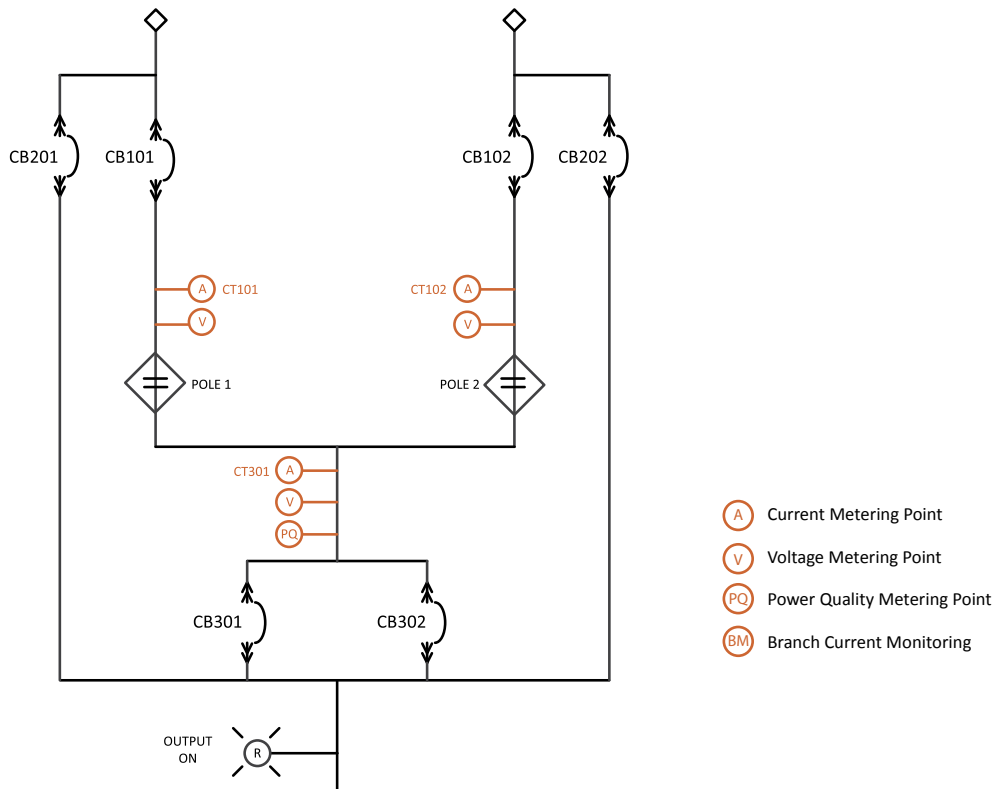


LayerZero Zen SSQM Display in ePODs: Type-N

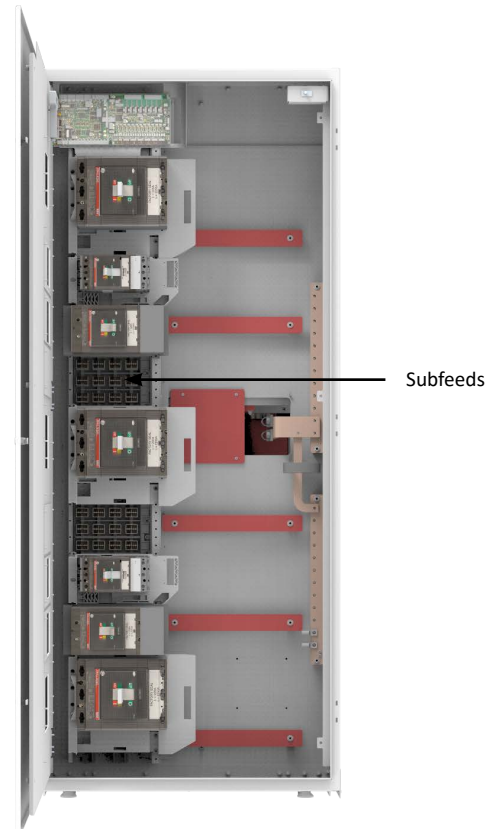
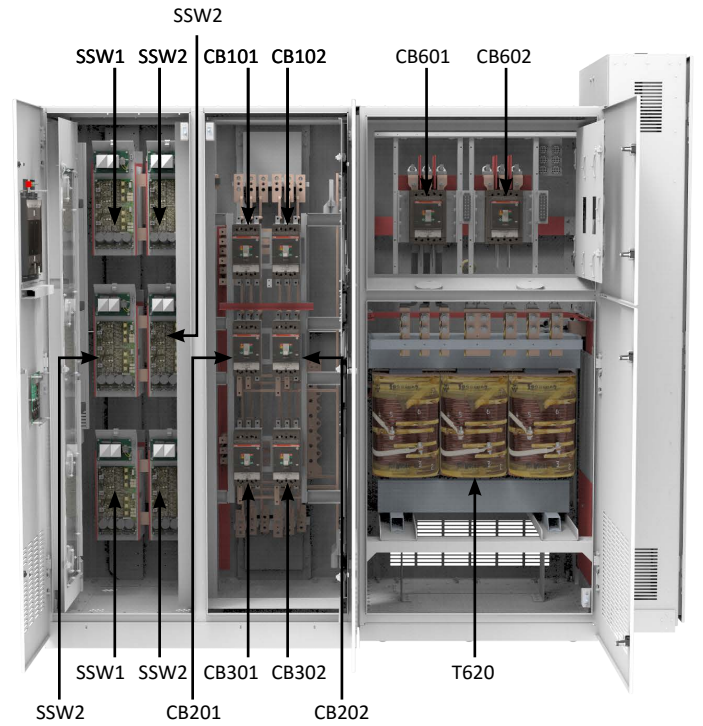
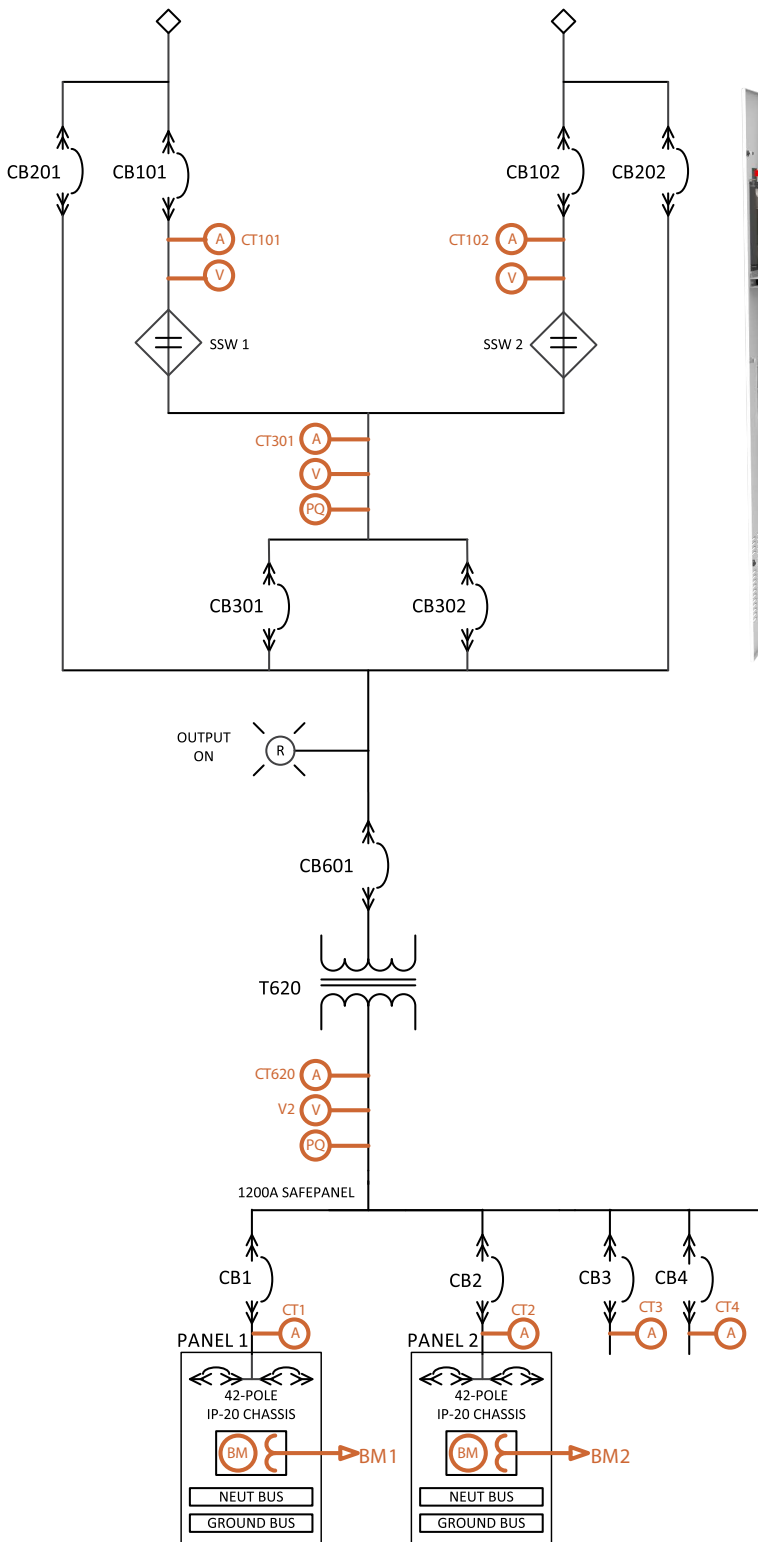


The LayerZero Zen SSQM System Control Board

Series 70: eSTS/eGIS

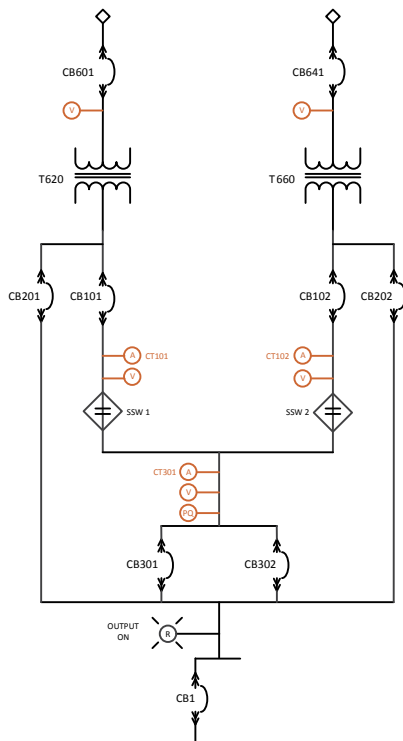


Series 70 ePODs: Type-P

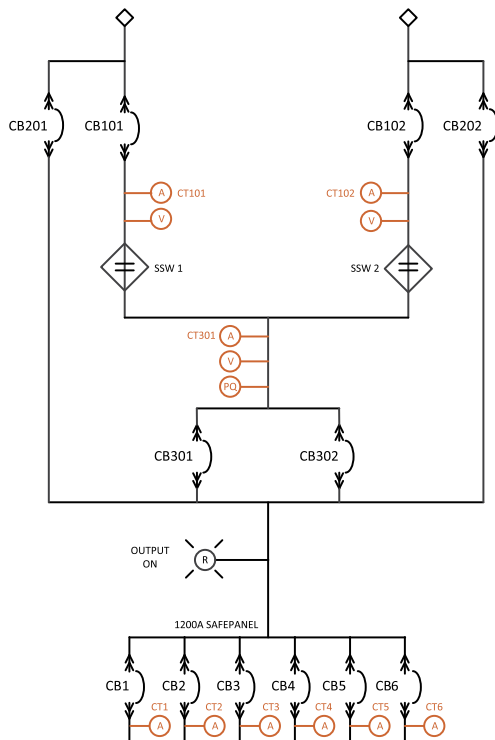




**Series 70 ePODs: Type-S**



**Series 70 ePODs: Type-N**





Zen produces real-time waveform captures for every pole of every breaker.



Zen synchronizes its clock with an external reference via the network



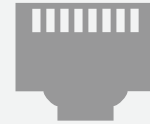
Zen allows you to pinpoint the exact moment that power quality events happen.



Zen display provides local viewing of all parameters via touch screen display.



Zen equips you with the ability to view meters and waveforms remotely.



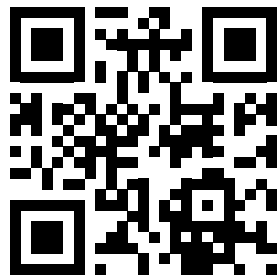
Zen connects to the network with an Ethernet connection.

**MODBUS**  
—  
TCP

Zen supports Modbus/TCP for open connectivity.



Zen permits connectivity to SNMP for Remote Monitoring.



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