Maintenance, Repair, & Operations Service Provider for Bitcoin Miners

Prepared by:
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Americas Largest Refurbishing Center for Bitcoin Miners

We have processed more than 75K miners in 2025.

We operate from our 100K sq. ft facility in Dallas, Texas.

About ACS

Repair Services

Hash board component level repair at competitive prices. Throughput of 300+ boards per day.

Refurbishing & 3PL

Immersion to air restoration, thermal paste re-application, cleaning, resale, and 3PL services.

Field Services

Hash board and miner swap programs with recurring deliveries to maximize uptime.

Inspections & DOA

Serialized hash rate reports for buyers and sellers of secondary equipment. DOA coverages to ensure you don’t get burned.

Improving LVRT Capabilities

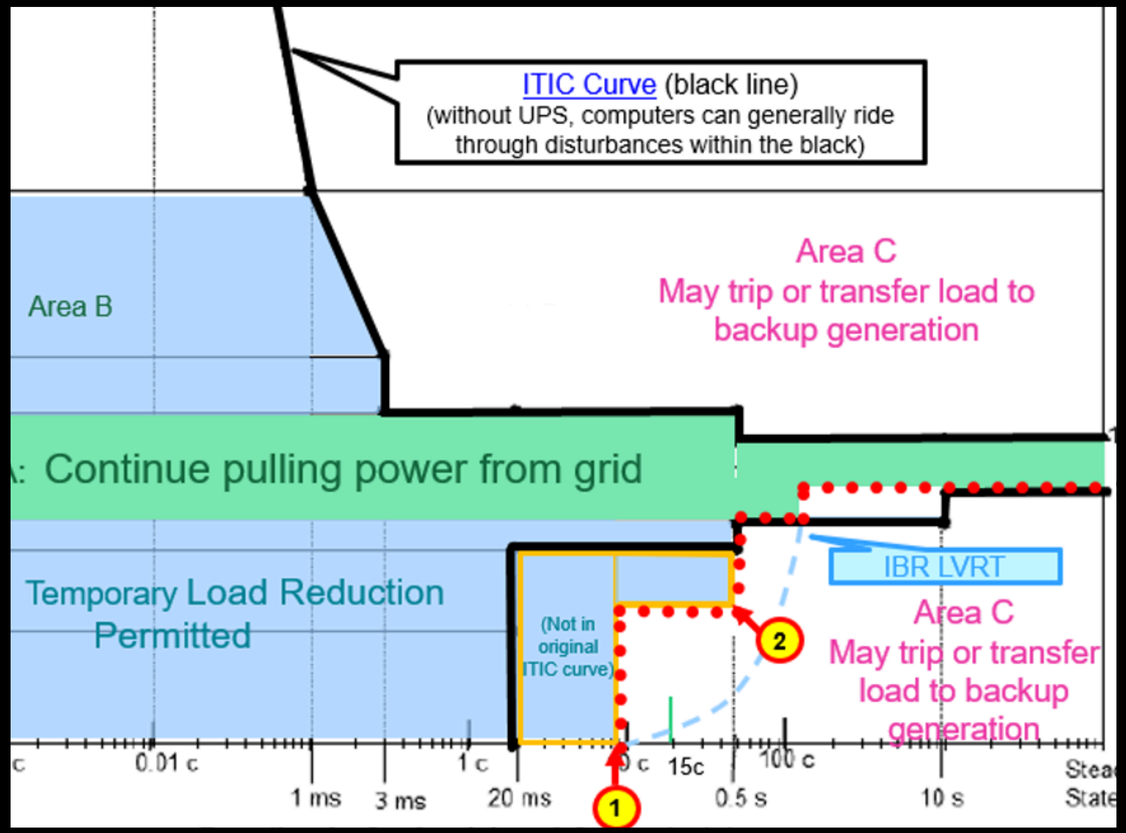
Possible solutions at the hardware level

New for Low Voltage Ride Through (LVRT)

ERCOT Proposed Requirements

If voltage is below 50% you should stay online for 10 cycles (160ms)

If voltage is between 50% - 80% you should stay online for 30 cycles (500ms)



Key Parts of a Bitcoin Miner

Power Supply

The Main Power Source

Control Board

The Brains of the Device

Hashboard

The Main Power Draw

2 Solution Paths

ERCOT has met with multiple data center owner/operators to discuss current ride-through capabilities and UPS designs

- ERCOT identified common practices that would disconnect LELs almost immediately from the grid for several seconds or longer during common voltage disturbances

ERCOT/NERC/TRE teams have met with multiple owner/operators of cryptocurrency mining facilities involved in observed events

- Team discovered a wide variance of electrical and protection system designs that may be improved to increase ride-through capabilities during single-line-to-ground fault events (Δ-Y transformer windings, balance of phase protections, VFD ride-through settings, etc.)
- Due to lack of UPS, facilities have limited ride-through capability during phase-to-phase or 3ph faults; will likely trip or reduce consumption when voltage drops outside of ITIC curve

ERCOT has observed that all LELs could potentially not ride-through phase-to-phase faults or 3ph faults with shallow voltage sags at POI

Allowance of temporary reduction of consumption in Area B

- Reduced consumption during voltage sags can improve voltage recovery
- More important that load returns as quickly as possible upon voltage recovery

Restoration of load within one second in Area B

- If load is restored within one second, impact to system frequency will likely be minimal (needs further study)
- Similar requirement and performance for IBRs; observed performance has shown minimal impact to system frequency
- Full vs. partial reduction of consumption from grid needs further study

Improve Ride-Through Capabilities

Fast Restoration of Load

Potential Solution 1

Larger Capacitance Banks installed internally in the PSU
to increase the LVRT capabilities.

Simulating how a UPS would handle LVRT events,
at a miner level instead of at an infrastructure level.

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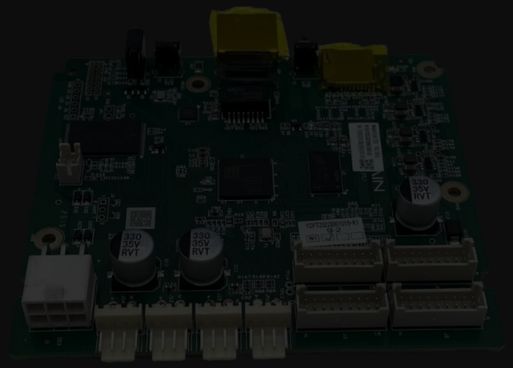

The Brains of the Device

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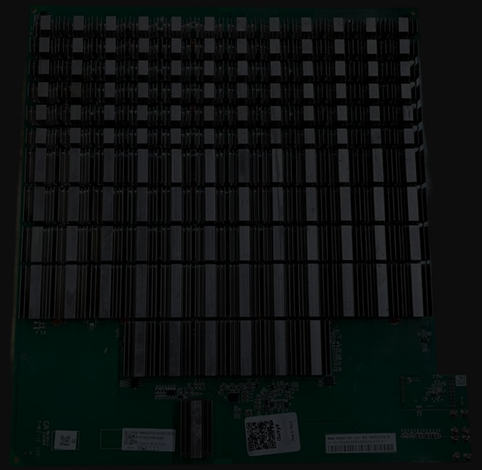
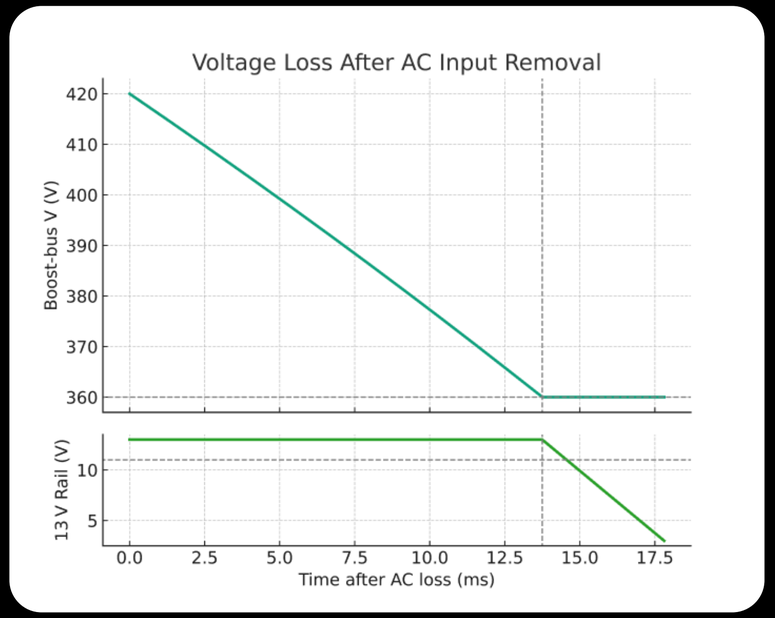


The Main Power Draw

Solution Downfalls



Mathmatical Issues

Current PFC Capacitor Bank (APW12): 470uF x 4 (1880uF)
Current Output Rail Capacitor Bank: 2500uF x ~40 (100,000 uF)
PFC Voltage Nominal: 420v
PFC Voltage Threshold 360v
Current Estimated LVRT capability: ~14ms
Estimated Caps needed for 160ms 47 470uF Caps on the PFC Circuit

Hardware Redesign Issues

Redesigning a PDU with 43 additional Large Capacitors is not viable

Potential Solution 2

Larger Capacitance Bank targeting Control Board logic circuits

Keeping the brain alive to help achieve fast restoration of load

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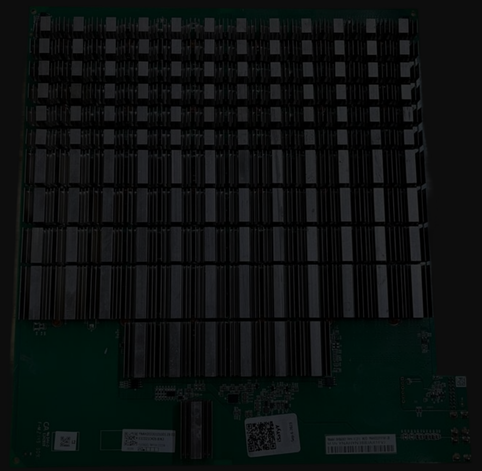


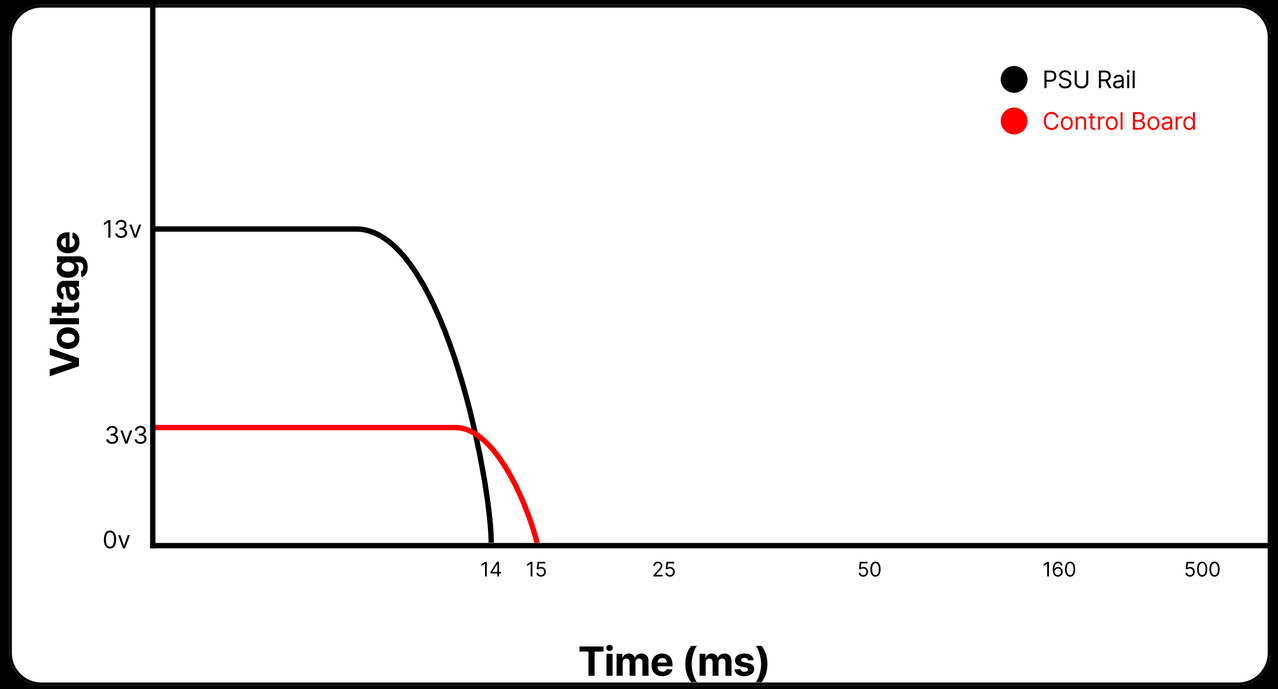
The Main Power Draw

Fast Restoration

Current Issue

Control board will loose power very shortly after the Power Supply loses power

Full power draw will be delayed by over 5 minutes after restoration of power

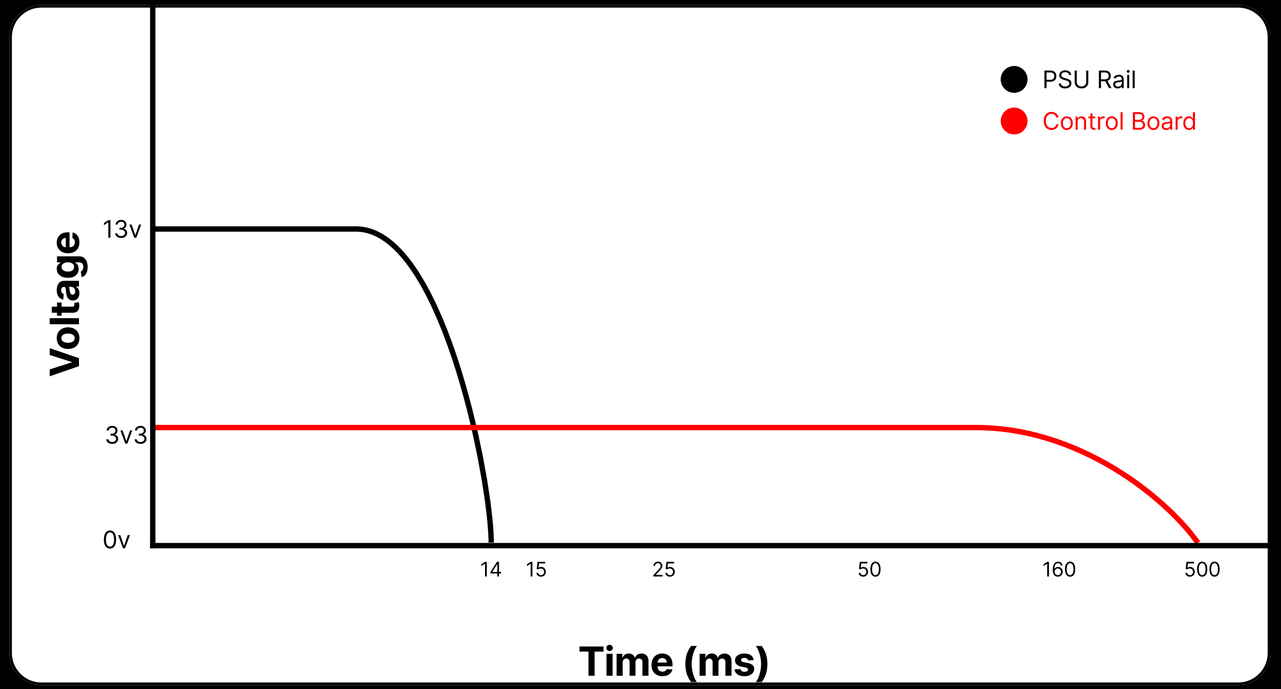


Fast Restoration

Potential Secondary Solution

Custom control board
Built for LVRT Requirements

Custom Built firmware design
For restoring load within 1 second



Proposed Solution Flow (Full Voltage Loss Scenario)

0 ms

LVRT Event is detected by infrastructure level monitoring system.

14 ms

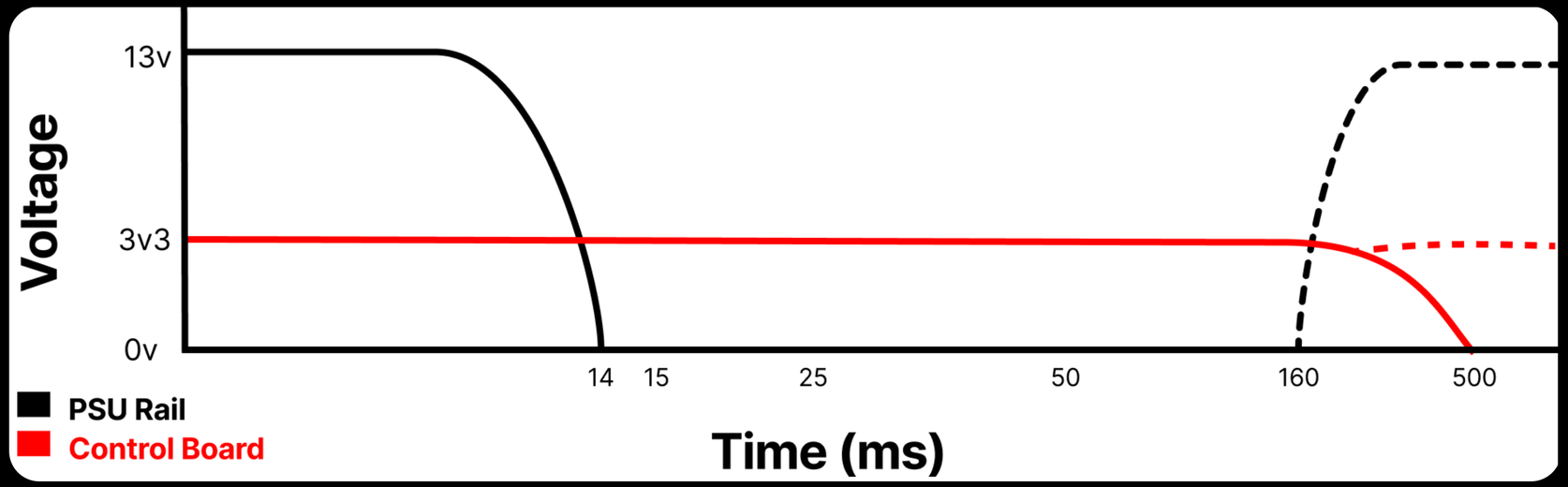
PSU loses output voltage. Control board remains powered by additional capacitor bank

160 ms

Voltage is fully restored and signal is sent to the control board

<1 second

Control board reinitializes core components back to pre-LVRT power levels



Hardware Testing and Data Gathering

Next Step Forward

- Understand hardware limitation
- Determine Thresholds
- Test new designs
- Compare with Proposed Requirements

List of Data Gathering Needed

DC Component Data

Understand the power curve of each individual component during a power loss event (hashboard, control board and firmwares)

Full Miner Testing

Combine individual component testing with a Grid simulator, and get real use case data, power curves, and LVRT capabilities

New Design Testing

Test new designs and overall ideas. Prove the viability of the solution.

Compile Results

Compare 3 main categories

- OEM Capabilities
- New Design Capabilities
- ERCOT Proposed Requirements

Questions

Infrastructure Cost

How does this solution tie into existing infrastructure?

ERCOT Requirements

Does this fulfill ERCOT proposed Requirements?

Testing and Verifying

How will we test and prove this solution to all parties?

Timeline Estimates

How much faster is this to implement than a full UPS system?

Contact us for more information

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