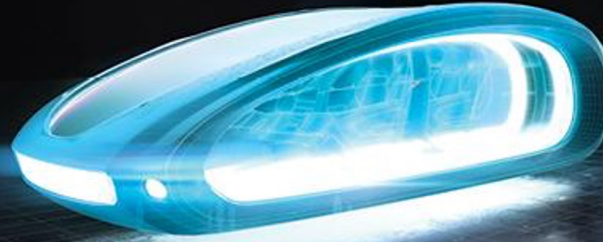


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The Uncertain Future of Aftermarket Loads in a 48V World – 24AE-0162

Dave McChesney
Strategic Account Manager

VICOR

Agenda

- The Problem: How to transition aftermarket loads to 48V
- Long Term Problem: Decades, not years
- Overlapping Timelines Create Complexity
- Tesla Cybertruck Demonstrates 48V Advantages
- Who should care about these use cases?
- What are the paths to address the transition to 48V?
- Solutions Pros and Cons
- Possible Solutions
- Vicor's Simple and Small Solution
- Summary and Conclusion

The Problem: How to Transition Aftermarket Loads to 48V

49% of truck owners add on aftermarket equipment

US aftermarket accessory market over \$200B in 2022

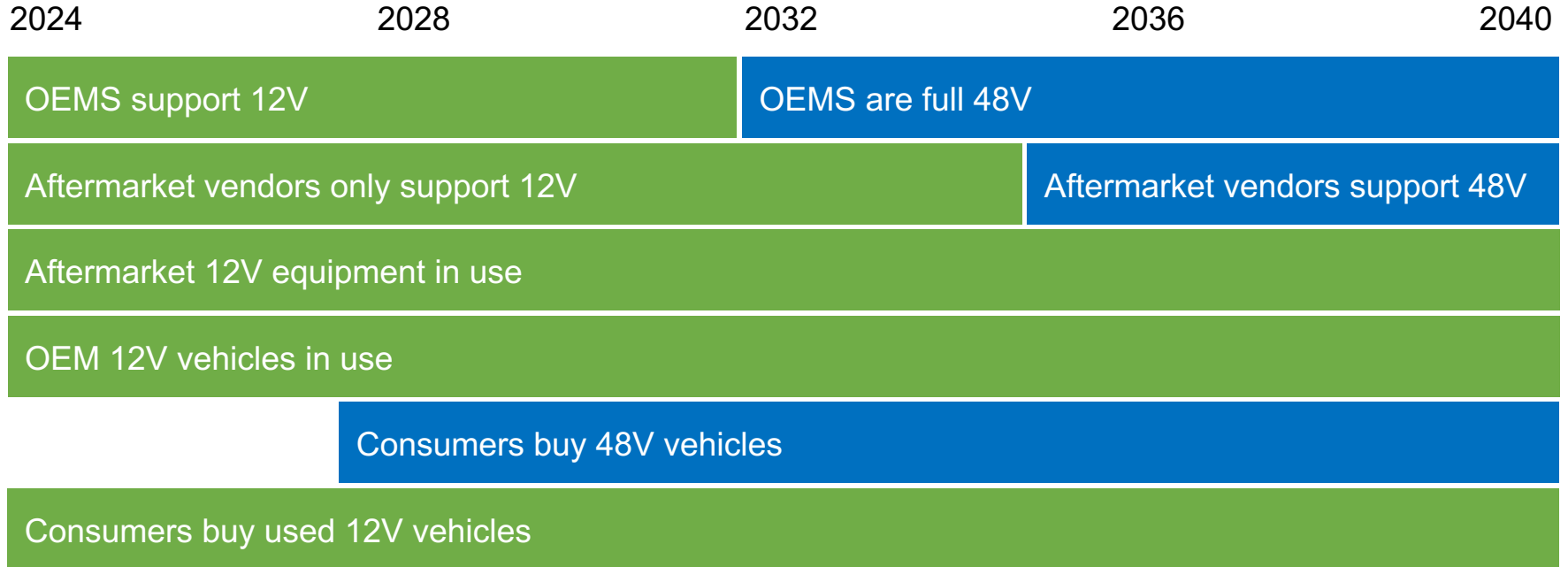
- OEMs cannot afford to leave their most profitable customers with incompatible electrical systems
- Aftermarket suppliers are not ready to support the transition to 48V



Long Term Problem: Decades, not Years

- Gradual transition of loads over to 48V
 - Most demanding loads first
- How long will this take?
 - For mass market adoption
 - For full implementation
 - For aftermarket suppliers to catch up
- Supporting all vehicles and all aftermarket systems

Overlapping Timelines Create Complexity



Tesla Cybertruck Demonstrates 48V Advantages

83% of the peak power comes from 13% of the loads.

— David Lau
VP, Software Engineering



Who Should Care about These Use Cases?

	Peak Power	Peak Current Draw	Wire Length	48V Wire Weight Savings
Winch 25k lbs	6.4kW	530A	1m	500g
Snowplow	3.6kW	300A	2m	1kg
Salt Spreader	1.5kW	125A	5m	2.5kg
Dump Bed	6kW	500A	10m	5kg
Lift Gate	4.8kW	400A	12m	6kg

What are the Paths to Address the Transition to 48V?

OEMs
offer both
12V and 48V
connections

Aftermarket
offers both
12V and 48V
versions

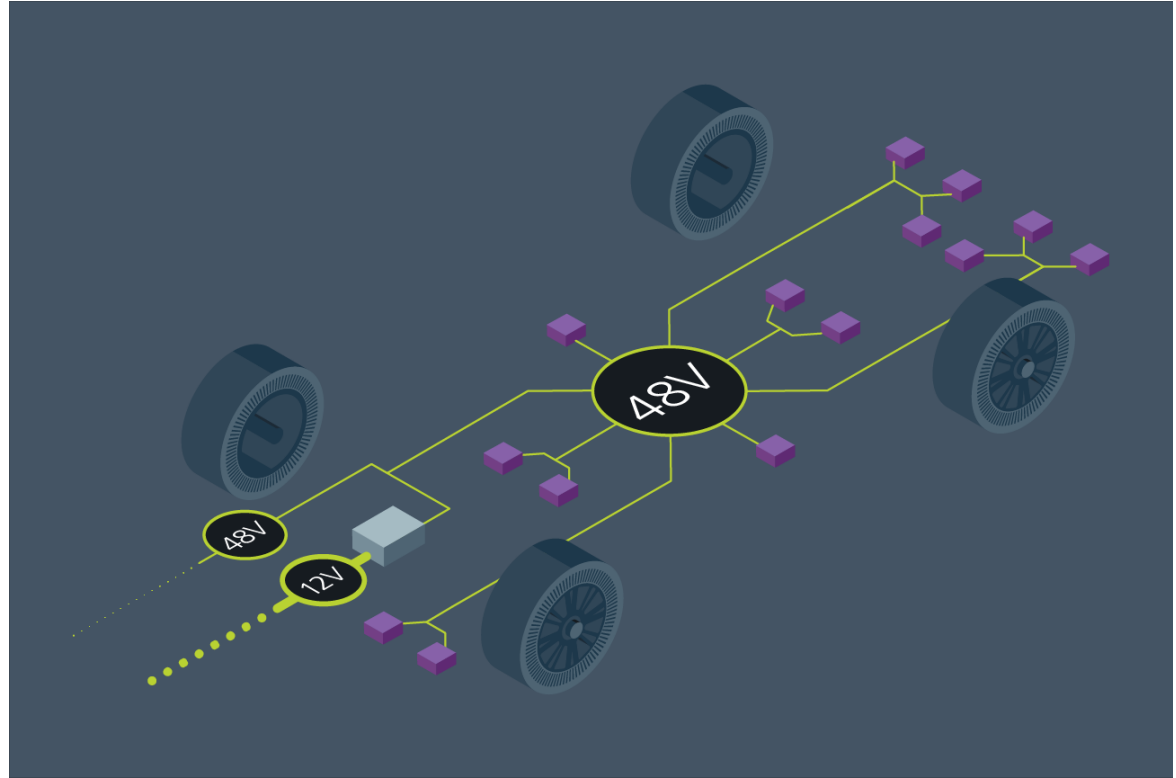
Consumer
DIY adapter
installation

Solutions Pros and Cons

	Pros	Cons
OEMs	<ul style="list-style-type: none">• Cleanly integrated in the vehicle• OEM standard equipment• Integrated into the vehicle safety compliance• Optional package available to the consumer• Covered under vehicle warranty	<ul style="list-style-type: none">• Higher vehicle cost• Double the connectors• Increased manufacturing complexity
AM	<ul style="list-style-type: none">• Better choices for the consumer• Added when required• Integrated into the accessory• Covered under accessory warranty	<ul style="list-style-type: none">• Engineering resources required• Carry double the SKUs• Extra cost to the consumer• No OEM/dealership support• Not covered under vehicle warranty
DIY	<ul style="list-style-type: none">• Most economical option• Added when required	<ul style="list-style-type: none">• Compatibility is not guaranteed• Installation risk• Weaker safety standards• No OEM/dealership support• Not covered under vehicle or accessory warranty• Not integrated into the vehicle/system

Possible OEM Solution

- 48V connection
- 12V connection using a small silver box



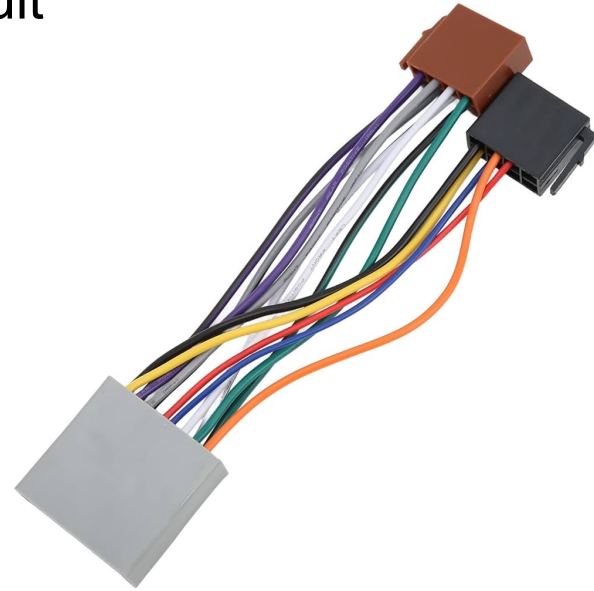
Possible Aftermarket Solutions

- DC-DC converter integrated in the 12V accessory
- Develop a new 48V version
- DC-DC converter offered as an in-line adapter delivered with the 12V accessory



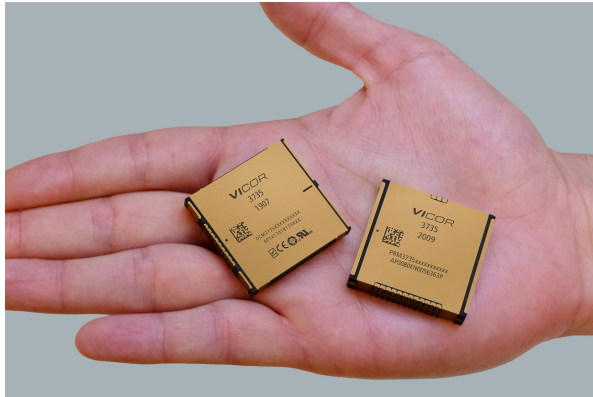
Possible DIY Solutions

- Connector, wire, electrical tape, circuit board, and solder
- Buy a third-party adapter

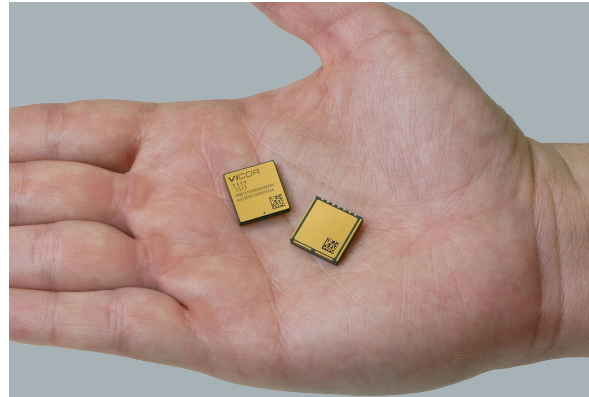


Vicor Simple and Small Solution

- Vicor integrated DC-DC converter modules take the complexity out of the power electronics design
- Miniaturizing the converters allow for in-line solutions



DCM3735: 2000W



PRM1515: 500W

Summary and Conclusion

- 48V is real and it's coming, the advantages are clear
- Moving to 48V will be a gradual at first, but 12V will stick around for decades
- If aftermarket needs are not supported, the adoption of new 48V trucks will be delayed by the consumer
- It is unclear who will provide the first solution
- Aftermarket suppliers are not ready – yet
- Vicor converters offer solutions for all of the paths

Contact Info

Thank you

Dave McChesney

Vicor

Detroit, MI

810-577-8547

dmcchesney@vicorpower.com