



## Submarine Sonar System

# Flexible, Low-noise Approach for Improved Detection Effectiveness



Low Noise



Low EMI



Small Size, Low Profile



High Efficiency

### The Customer's Challenge

We recently worked with a customer to develop a power solution for a performance upgrade to several interconnected active and passive sonar systems. The new power system, operating from 92 – 138 V<sub>AC</sub> (with a 74V brown-out spec), needed to deliver additional power to accommodate extra system functionality. It needed to do so in a much smaller space than the original solution, including any thermal management necessary. To reduce costs, the customer was looking for a power solution that could be reused across multiple systems and platforms.

As with all sonar applications, reduction of self-noise is a key element in the system's detection effectiveness. Therefore, conducted EMI and output ripple were key areas of focus for the power design.



### The Solution

A wide-input range PFM Isolated AC-DC converter and holdup capacitor converted the input voltage (including the brown-out transient) to a 24V bus voltage. A ZVS Buck-Boost Regulator provided the stable 28V output needed by the sonar system.

[Link to Whiteboard »](#)



### The Results

All products used are the industry's highest density, lowest profile power components, enabling the complete AC-to-load solution to fit within a footprint of just 58cm<sup>2</sup>, significantly smaller than the previous power supply. With the products' high efficiency, the system was able to be conduction cooled, further reducing the form factor. In addition, low noise switching topologies reduced the size of the EMI filtering required on the input, and the ripple filter needed on the output.

The use of Vicor's scalable and modular building block approach provided the flexibility needed for easy re-configuration without the need for a major redesign or an increase in size.

#### Product Family Key Specifications

##### PFM™ Isolated AC-DC Converters with PFC

|                 |  |
|-----------------|--|
| Input Voltages  | Universal rectified: 85 – 264 V <sub>RMS</sub>             |
| Output Voltages | 24V and 48V isolated and regulated outputs                 |
| Output Power    | 400W   |
| Efficiency      | Up to 92%  |
| Dimensions      | PFM 4414: 111 x 36 x 9.4 mm<br>PFM 4914: 125 x 36 x 9.4 mm |

##### Cool-Power® ZVS Buck-Boost Switching Regulators

|                 |                                     |
|-----------------|-------------------------------------|
| Input Voltages  | 16 – 34V, 21 – 60V                  |
| Output Voltages | 12 – 34V, 21 – 36V, 36 – 54V        |
| Output Power    | Up to 240W continuous               |
| Efficiency      | Over 98% efficiency at >800 kHz FSW |
| Dimensions      | LGA SiP: 10 x 14 x 2.5 mm           |