



Trackside Rail Signaling

High Density Power Chain Provides Redundancy in the Same Space



Small Size,
Low Profile



Redundancy /
Power Sharing



Harsh
Environments



High
Efficiency

The Customer's Challenge

Used to direct railway traffic and keep trains clear of each other at all times, reliability is a fundamental requirement for rail signaling equipment; the travelling public expect it and governments regulate for it.

One company was upgrading the functionality of its rail signaling equipment to improve performance and reduce whole life costs and operational risks, with a resultant increase in power required. To meet enhanced reliability targets a fully redundant power supply was necessary. All upgrades to performance and power needed to occupy the same space as the original supply. Including any heat management required to operate reliably in the harsh environments faced by externally-mounted signaling equipment.

To complicate the power design task still further the solution needed to be backwards compatible and must meet stringent environmental and electrical standards.



The Solution

A PFM isolated AC-DC converter was used to convert the AC voltage to a 24V rail. The ZVS Buck-Boost regulator array provided the tight regulation required by the equipment. This was replicated for the redundant system.

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The Results

The very low profile and small size of the power components used enabled a complete AC-to-load power supply to be developed with a footprint of just 58cm². This meant that both complete power supplies could be fitted into the very limited space available.

Due to its ZVS topology the PI3749 Buck-Boost regulators offers high efficiency operation of over 98% across the range of input voltages. This enabled the high system efficiency of 90%, and the operation at high temperatures without de-rating. Conduction cooling further simplified heat management and enhanced reliability. In addition, the robust (fanless) solution met environmental requirements.

Product Family Key Specifications

PFM™ Isolated AC-DC Converters with PFC

Input Voltages	Universal rectified: 85 – 264V _{RMS}
Output Voltages	24V and 48V isolated and regulated outputs
Output Power	400W
Efficiency	Up to 92%
Dimensions	PFM 4414: 111 x 36 x 9.4mm PFM 4914: 125 x 36 x 9.4mm

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 >800kHz FSW
Dimensions	LGA SiP: 10 x 14 x 2.5mm