



Server Processors | FPGAs | Supercomputers | Telecom, Networking, Datacenter | Graphics & Video Processors

# Digital DC-DC Power Module



Power management has become a critical issue in telecom, networking and computing applications. The considerations involved go beyond a simple efficiency calculation, requiring developers of data centers, telecom central offices, cloud infrastructure and hyperscale installations to consider factors such as thermal and load management.

Digital control techniques offer you a comprehensive solution to provide monitoring and management functions. Monitoring voltage, current, power and temperature allow you to measure the power demand of the system and actively control the units. These monitoring functions can also be configured to generate warnings if shutdown points are approached, which improves system reliability and can improve up time.

Digital and analog converters have much in common, with similar power switching devices and magnetic structures (inductors and transformers).

However, the vital inner control loop design, which has traditionally been the domain of analog engineers, can now be implemented using digital techniques. Communications, monitoring and control are implemented over the industry-standard PMBus<sup>®</sup> command protocol.

In the design phase, digital control means that a unit can be configured to be optimal for the system/application with far greater flexibility than analog controlled units. In deployment, the power system can dynamically adapt to changes in operating conditions – all in real time.

The movement to a digital distributed power architecture allows much greater flexibility and control in system design, management and monitoring functions.

**300 W, 500 W  
and 700 W  
Isolated Bricks**

**200 W  
Non-isolated Unit**

**Isolated:  
48 V Input**

**Non-isolated:  
7.5 – 14 V Input**

**Isolated Brick  
Output: 12 V**

**Non-isolated  
Output: 0.6 – 5.2 Vdc**

**Standard PMBus  
Controlled  
Isolated and  
Non-isolated Units**

**DOSA  
Footprint  
Isolated Brick  
Form Factor**

# Artesyn Digital DC-DC Converters

Digital control and monitoring enables a wide range of functions not typically available when using analog-controlled modules, including application-tailored overcurrent protection limits, temperature warning levels, reporting of fault conditions, modified output voltages, and real-time power and efficiency monitoring, all via the PMBus interface. For example, some processors have recommended power rail start-up characteristics, which can be configured digitally and applied to the DC-DC module. Control loops can also be modified to accurately suit the transient load characteristics of applications.

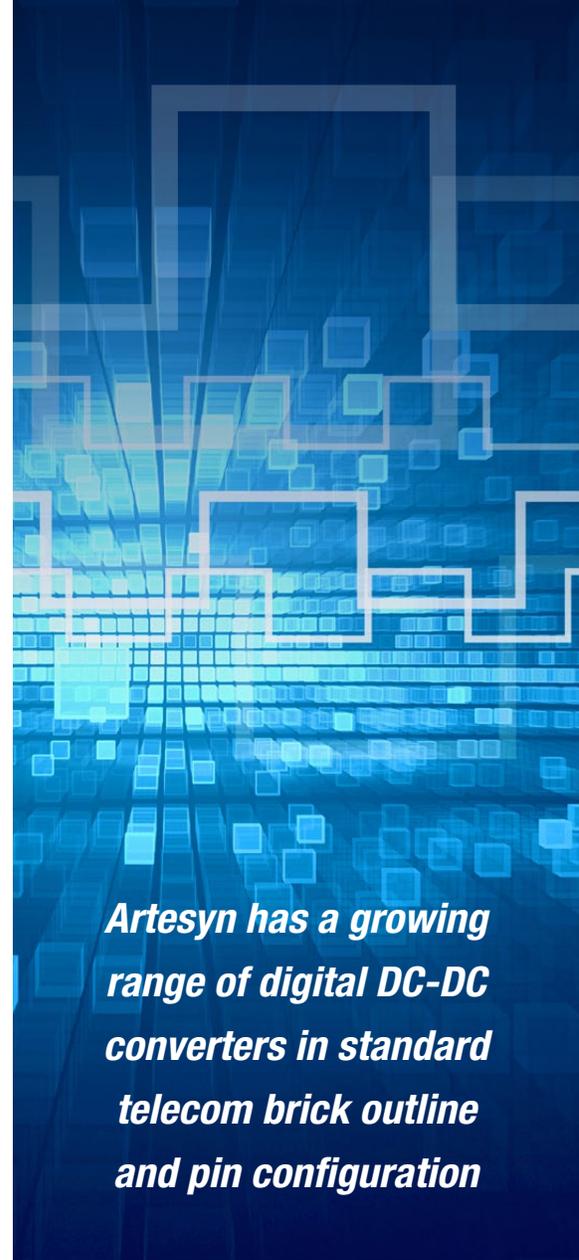
## Isolated DC-DC Modules

These single output isolated modules offer excellent thermal performance, which, together with an enhanced pre-bias start-up capability, makes them an ideal choice for use in data processing and telecommunication applications, particularly in the application of supplying power to non-isolated modules.

Their open-frame design is optimized for forced air or conduction cooling or an aluminum baseplate option is available for enhanced thermal performance.

Artesyn's isolated digital DC-DC converters are low profile units that are ideal for systems with demanding inter-board spacing requirements; the open-frame models have an installed height of 0.43 inch (11 mm), while the baseplate versions require 0.52 inch (13.3 mm).

The 1/8 brick and 1/4 brick units follow the industry standard PMBus interface DOSA footprints, giving you options to scale your power module with your application, from 300 to 700 watts.



*Artesyn has a growing range of digital DC-DC converters in standard telecom brick outline and pin configuration*



### 300 W 1/8 Brick

ADO300

- 36 – 75 V input range
- Up to 26 A output current
- 11.7 V output voltage
- 95.2% typical efficiency



### 500 W 1/4 Brick

ADQ500

- 36 – 75 V input range
- Up to 42 A output current
- 12 V output voltage
- 96% typical efficiency



### 700 W 1/4 Brick

ADQ700

- 40 – 60 V input range
- Up to 58 A output current
- 12 V output voltage
- 96% typical efficiency

## LGA80D 200 W Non-isolated Unit

With a footprint of 1" (25.4 mm) by 0.5" (12.5 mm), the LGA80D represents one of the highest density current ratings available in the industry. This innovative unit offers two 40 amp outputs, which can either be configured to a single 80 amp output or completely independently controlled. It is also possible to generate a higher current, up to 320 amps as a single power rail, by connecting up to four units in parallel. The wide trim feature of the LGA80D (from 0.6 to 5.2 volts) makes it suitable for use with a broad range of semiconductor devices.

The Artesyn LGA80D offers 95.5% typical efficiency, one of the highest available in this category. When subjected to a cooling airflow of 200 lfm (1 m/Sec), the derating of the unit commences at an ambient air temperature of 70 °C.

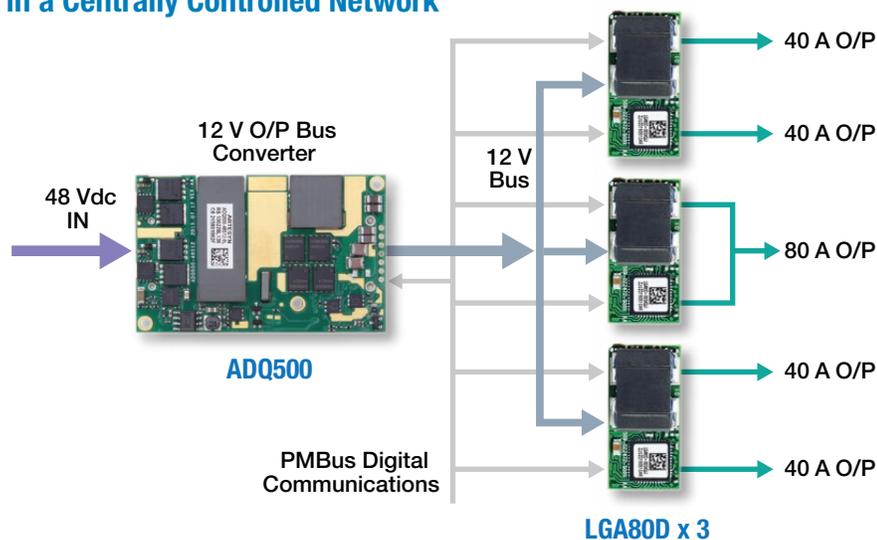
## Evaluation Kits

Artesyn offers two evaluation kits for the range of digital DC-DC modules, to cover the isolated and non-isolated units. Using these evaluation kits, you can connect the demonstration board to a USB socket on a PC with the PMBus interface dongle and cable provided, and control and monitor the DC-DC modules as they would be used in an application.

There are hardware functions on the demonstration board that allow you to enable and select an output voltage by simple dip-switch settings, and the board provides voltage and ripple measurement points. The isolated demonstration board can be connected to the non-isolated board, enabling you to test the full DC-DC conversion process from 48 V DC input at the system level to the low voltages at the processor level, with digital control throughout.

The 1/8 brick and 1/4 brick units follow the industry standard PMBus interface DOSA footprints, giving you options to scale your power module with your application, from 300 to 700 watts.

## Isolated and Non-isolated Converters in a Centrally Controlled Network



**200 W**  
LGA80D

- 7.5 – 14 Vdc input voltage
- Up to 80 A (two 40 A channels) output current
- 0.6 – 5.2 V output voltage
- Up to 95.5% typical efficiency

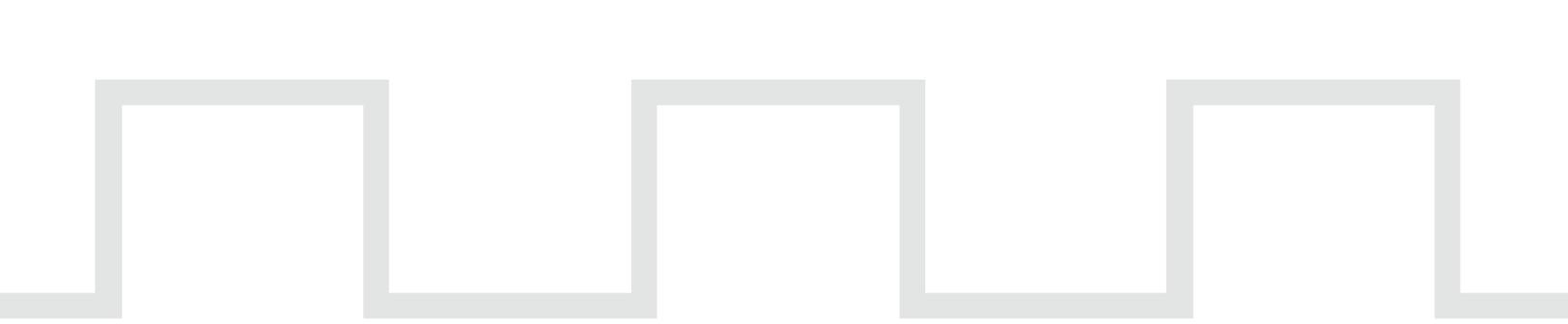


**Isolated:** A single demonstration board can be used with all three isolated modules.



**Non-isolated:** The demonstration board is populated with two LGA80D modules, allowing you to test independent channel or stacked-module operation.





**Artesyn produces an exceptionally broad range of products spanning every aspect of the computing, storage and networking market sector. These include front-end AC-DC and DC-DC power supplies, isolated brick-type DC-DC converters, and non-isolated point-of-load (POL) DC-DC converters.**

Artesyn Embedded Technologies is a global leader in the design and manufacture of highly reliable power conversion solutions for a wide range of industries including communications, computing, consumer, medical, aerospace and industrial automation.

Artesyn Embedded Technologies is one of the world's largest and most successful power supply companies, also embracing the well-known Astec brand. The company's extensive standard AC-DC product portfolio covers a power range of 3 watts to 24 kilowatts and includes open-frame and enclosed models, highly configurable modular power supplies, rack-mounting bulk front end units, DIN rail power supplies, external power adapters and power supplies for LED lighting. Many of these products are available in medically approved versions and a large number of the higher power models feature extensive built-in intelligence.

As an industry leader in distributed power applications, Artesyn produces an exceptionally wide range of DC-DC power conversion products. These include

isolated DC-DC converters, covering industry-standard sixteenth- to full-brick form factors with power ratings from 3 watts to 800 watts. Artesyn also offers three application-optimized families of non-isolated DC-DC converters, non-isolated memory power, and processor voltage regulator modules (VRMs).

As a pioneer in low power switch mode adapters, Artesyn has designed and manufactured solutions for almost every major mobile phone supplier. With well over one billion chargers shipped from its best-cost facilities, Artesyn has aligned itself to meet the demands for the next billion chargers through new platforms, automated manufacturing methodology and unsurpassed quality and reliability.

For more than 40 years, customers have trusted Artesyn to help them accelerate time-to-market and shift development efforts to the deployment of new, value-add features, and services. Artesyn has over 20,000 employees worldwide across ten engineering centers of excellence, four world-class manufacturing facilities, and global sales and support offices.

## WORLDWIDE OFFICES

### Americas

2900 S. Diablo Way  
Tempe, AZ 85282  
USA  
+1 888 412 7832

### Europe (UK)

Waterfront Business Park  
Merry Hill, Dudley  
West Midlands, DY5 1LX  
United Kingdom  
+44 (0) 1384 842 211

### Asia (HK)

14/F, Lu Plaza  
2 Wing Yip Street  
Kwun Tong, Kowloon  
Hong Kong  
+852 2176 3333

**ARTESYN**<sup>™</sup>  
EMBEDDED TECHNOLOGIES

[www.artesyn.com](http://www.artesyn.com)

For more information: [www.artesyn.com/power](http://www.artesyn.com/power)  
For support: [productsupport.ep@artesyn.com](mailto:productsupport.ep@artesyn.com)

Artesyn Embedded Technologies, Artesyn and the Artesyn Embedded Technologies logo are trademarks and service marks of Artesyn Embedded Technologies, Inc. All other names and logos referred to are trade names, trademarks, or registered trademarks of their respective owners. Specifications are subject to change without notice. © 2017 Artesyn Embedded Technologies, Inc. All rights reserved. For full legal terms and conditions, please visit [www.artesyn.com/legal](http://www.artesyn.com/legal).

DigitalDCDC – R1 June 2017