



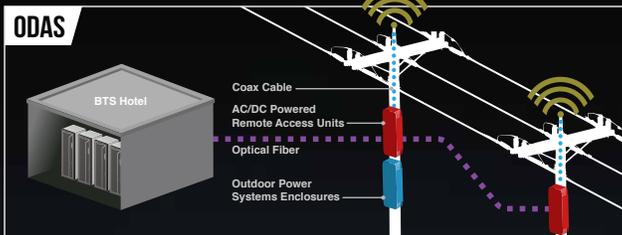
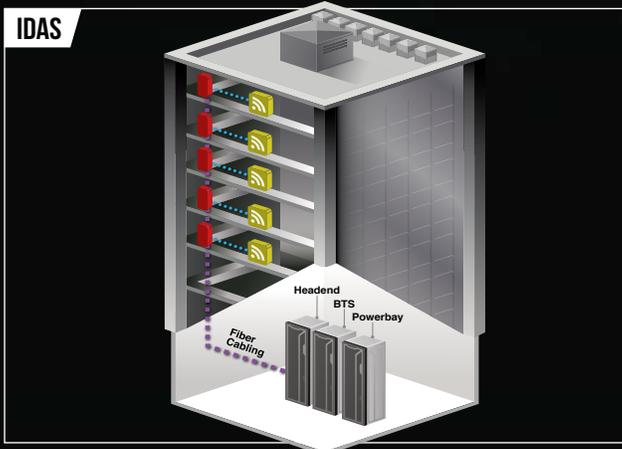
Alpha Powers DAS Networks



Your Power Solutions Partner

Alpha overcomes your DAS infrastructure powering challenges

Alpha combines its expertise in base station power and outdoor broadband power equipment cabinets to deliver end-to-end Distributed Antenna System (DAS) power solutions from the base station, to the head end, to the remote radios. For both indoor and outdoor networks, our solutions include AC and DC power and battery backup systems that match the requirements of the DAS equipment and the operator. Our solutions are housed in aesthetically pleasing cabinets that blend in with the environment. And, we pioneered the powering of indoor DAS remotes using copper cable. With more than 5 years of DAS powering experience, including high end communities, event venues and carrier network extensions, Alpha is the leader in powering DAS networks.



Alpha DAS Powering Solutions include:

- Large +24V and 48V power plants for base stations
- Rugged Uninterruptible Power Supplies (UPS) for AC-powered outdoor remote nodes
- Compact 48V rectifier plants for DC-powered indoor or outdoor remote nodes
- 48V line powered systems for indoor DAS nodes
- Enclosures for pole, wall or ceiling-mounted power systems
- Batteries for small and large battery backup requirements



ODAS

Outdoor DAS remote access units are typically AC powered, though some products are now transitioning to DC. An ODAS remote can consume from 400 to 3600+ watts of power, depending on the configuration. DAS remotes with AC inputs are typically powered with one of Alpha's rugged FXM UPS products for deployment in outdoor environments. The FXM's can be mounted in a variety of enclosures designed to meet the structure, capacity and aesthetics of an application.

FXM family

The FXM family of rugged UPS power modules is engineered for a broad range of applications. Available from 350W to 2000W, the FXM UPS is designed for the most demanding environment where clean backup power is needed. FXM units ensure DAS equipment, and many other critical applications, remain safe and protected from power disturbances. FXM's powerful (and programmable) battery charger is capable of providing the runtime you need.

Enclosures

Alpha offers compact power system enclosures that are designed to operate reliably in extreme environments of heat, moisture, dust, temperature and vibration, yet are ideal for locations where aesthetics are important. Some of the most widely deployed ODAS enclosures include the TE13-2128, TE27-2218 and the newly introduced TE40-2425.

TE13-2128 Enclosure

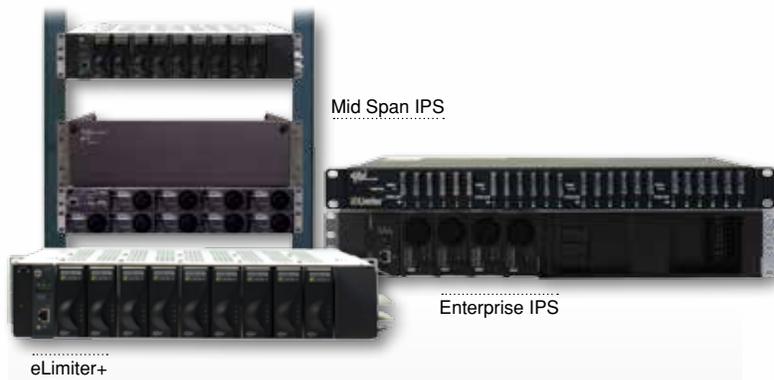
An IP66-rated enclosure engineered to house an FXM UPS and up to four AlphaCell™ 85GXL batteries, this ceiling mount power system enclosure is the ideal solution for space constrained applications such as underground subway stations where ceiling mount is the only option.

TE27-2218 Enclosure

The TE27 is a multi-mount outdoor enclosure that can be pole, host, wall or pedestal-mounted, making it the perfect choice for locations where confined space necessitates creative installation options. It is engineered to house an FXM UPS, transfer switches and up to four AlphaCell™ 195GXL front terminal batteries.

TE40-2425 Enclosure

A GR487-certified dual compartment enclosure, the TE40 is designed to provide operational cost savings using a heat exchanger to cool equipment in the sealed upper compartment and ambient cooling for batteries in the vented lower compartment. The optional battery expansion cabinet can be easily added to the base enclosure to provide extended backup time.



IDAS

Indoor DAS remote access units are typically DC powered, though some AC products are still available. An IDAS remote can consume up to 450W of power, depending on the configuration. Alpha's primary solution for IDAS remotes is to power them from the Head End using copper cables to carry the current to the remotes. Our line powered products also come packaged with a rectifier system and/or batteries for use in enterprise applications, or for deployment in a mid-span arrangement at a large indoor venue.

eLimiter+

The eLimiter+ builds on the current limiting circuitry Alpha pioneered with the eLimiter Class 2 power system, by adding on-board DC-DC converters and intelligent remote control. The eLimiter+ provides 4-channel plug-in modules with each channel including active current limiting circuitry and 48:57 volt DC-DC conversion. A single 19-inch, 2RU shelf supports up to nine (9) modules, or 36 circuits, and includes an intelligent controller for remote access, control and monitoring.

Enterprise IPS

Alpha offers special configurations for enterprise venue owners who provide their own DAS networks and want to avoid placement of batteries at the remote locations. Designed for placement at the DAS head end, these configurations combine Alpha's eLimiter™ Line Power system with our standard rectifier plants and AlphaCell batteries. The package provides a complete solution for locally powering DAS Head End equipment and remotely powering the DAS remote nodes up to 750 feet from the DAS Head End.

Mid-Span IPS

Alpha offers special configurations for large venues that cannot reach all DAS remote nodes from a centralized line power site. The Mid-Span IPS consists of Alpha's eLimiter+ extended reach Line Power System with standard rectifier plants, distribution, and AlphaCell batteries. By placing the Mid-Span IPS between the Head End and the edge of the DAS network, the service provider can reach remotes up to 1500 feet away, eliminating the need for batteries at all DAS remotes in the facility.

IDAS Aggregator

The IDAS Aggregator solves the problem of (how to) line power larger IDAS remote access units. The Aggregator combines multiple NEC Class 2 circuits into a single device that produces a single, large power output. When used in conjunction with Alpha's eLimiter or eLimiter+ products, the Aggregator provides electrical isolation between the incoming Class 2 cables, ensuring compliance with NEC and CSA/UL requirements.

Head End

Head End DAS equipment, which consists of interfaces to the base stations and devices that convert RF energy into light energy for transport over fiber optic cables, can operate off 120Vac and/or -48Vdc, and often requires a mixture of the two. The amount of power required can range from a few hundred to a few thousand watts of power depending on the size of the venue. In some cases, the DAS provider may also supply power for the base stations which increases the -48Vdc demand by several thousand watts. Alpha has power solutions for all types of Head End configurations, including inverters for AC-powered equipment.

CXPS-M 1200

The CXPS-M 1200 is a midsize power plant that can be equipped with either single or dual voltage outputs, enabling service providers to power Cell Sites or small Central Offices with a single bay of power. Unlike other midsize power plants, the CXPS-M features oversized buswork and 25mV shunts along with high efficiency rectifiers to maximize operating efficiency and lower OPEX.

CXPS-D 48-5000

The CXPS-D 48-5000 is an ultra-compact, high capacity, high efficiency, intelligent power system with flexible distribution options. It enables service providers to locate the power plant near the connected equipment, eliminating BDFB's and the associated cabling and installation costs. Unlike other single bay power systems, the CXPS-D flexible distribution options can be equipped with up to 96 small capacity circuits or with a number of high capacity circuits to feed remote BDFB's, increasing the number of distribution points.

Small Rack Mount Plant

For sites that only require power for the DAS Head End equipment, Alpha offers a range of small rack mount power systems that can be configured to meet the needs of the application. With shelf-based rectifier plants ranging from 4.8kW to 12kW, Alpha can source power for any DAS Head End arrangement. In addition, a wide range of battery options are available to match the reserve time requirements for the site. Lastly, the power system can be equipped with either in-board or out-board distribution to deliver the power to all the loads at the site.

Mini-Case Study

Alpha Technologies Powers NYC Subway DAS



With over 277 underground stations and an annual ridership exceeding more than one billion, the New York City subway system is the largest and most established of its kind in North America. In 2011, an ambitious plan was developed by Transit Wireless and the Metropolitan Transportation Authority (MTA) to use DAS as a means of blanketing all 277 underground subway stations with mobile voice and data

coverage for commuters, emergency and security services. Given the critical nature of this application and the harsh, variable subterranean environment, Alpha was brought in to configure a customized power solution that could withstand extremes of temperature,

Alpha was brought in to configure a customized power solution that could withstand extremes of temperature, moisture, vibration and shock

moisture, vibration and shock, while meeting all their operational load requirements such as battery backup time in the event of a grid failure. Alpha's solution came packaged as a ceiling mounted cabinet (able to support 250lbs of gear, with an Ingress Protection rating of 66), FXM 2000 outdoor rated UPS module and AlphaCell 85GXL batteries. Expected to be completed by 2016, the network will host services provided by the four biggest wireless carriers, AT&T, Sprint, T-Mobile & Verizon and others.

See our other case studies at www.alpha.ca/case-studies

Major wireless carriers and DAS integrators in the US and Canada are using Alpha's power systems to backup their IDAS and ODAS nodes.

Contact our Power Experts and find out why:

1.800.667.8743

sales@alpha.ca

www.alpha.ca



The Alpha Group Alpha Technologies Ltd is a proud member of The Alpha Group - an alliance of independent companies who share a common philosophy - to create world class powering solutions. Collectively, Alpha Group members develop and manufacture AC, DC and renewable power conversion, protection and standby products, featured in millions of operational installations around the world today.

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Free DAS Resources - available online

DAS Landing Page www.alpha.ca/DAS

Video Series www.alpha.ca/DAS

Tutorial 1 Distributed Antenna Systems (DAS) 101

Tutorial 2 Introduction to DAS Architecture

Tutorial 3 Players Involved in the Deployment of a DAS Network

Tutorial 4 Powering Indoor Distributed Antenna Systems (iDAS Systems)

Tutorial 5 Powering Outdoor Distributed Antenna Systems (oDAS Systems)

Alpha Whitepapers www.alpha.ca/DAS

Introduction ATL Powering IDAS Networks

Chapter 1 IDAS Network Overview

Chapter 2 Local Power Solutions

Chapter 3 Line Powering IDAS Remotes

Chapter 4 Extending the Reach

Chapter 5 Powering Large IDAS Nodes

Alpha Products

FXM family www.alpha.ca/alpha-fxm-350-2000

TE13-2128 Enclosure www.alpha.ca/TE13-2128

TE27-2218 Enclosure www.alpha.ca/TE27-2218

TE40-2425 Enclosure www.alpha.ca/TE40-2425

eLimiter+ www.alpha.ca/eLimiterPlus

CXPS-M 1200 www.alpha.ca/CXPS-M-Series

CXPS-D 48-5000 www.alpha.ca/CXPS-D

For special configurations such as the Mid-Span IPS, IPS, Enterprise and small rack mount. Please contact Alpha Sales at 1.800.667.8743 • sales@alpha.ca • www.alpha.ca



Alpha powering DAS headend equipment at Washington Nationals Ballpark; 16 sectors UMTS (4C; both 850 & 1900), and 16 sectors of LTE (700 MHz only)

Visit us at www.alpha.ca

