

Custom Capabilities

AC and DC Primary Power Distribution Assemblies



LEACH® INTERNATIONAL

Solutions for Power Switching and Control

Innovative Engineering Design Since 1919

Technological firsts are the cornerstone of Leach International. Beginning with development of the first "break-in" relay and continuing with a series of innovations that includes "Balanced Armature" and Balanced-Force® relays, rotary solenoids, power contactors, and crystal can and time delay relays, Leach International has established a rich tradition of innovation and engineering excellence. For more than 80 years, the company has been designing and manufacturing electrical switching and control components for military, aerospace, rail and high-end industrial applications. This long history of outstanding performance has been integrated into Leach International's custom-designed primary power distribution assemblies (PDAs).

Utilizing its extensive design, engineering and manufacturing skills, Leach International offers customized AC and DC PDAs manufactured to the exacting standards and specifications required by today's sophisticated applications.

Applications Worldwide



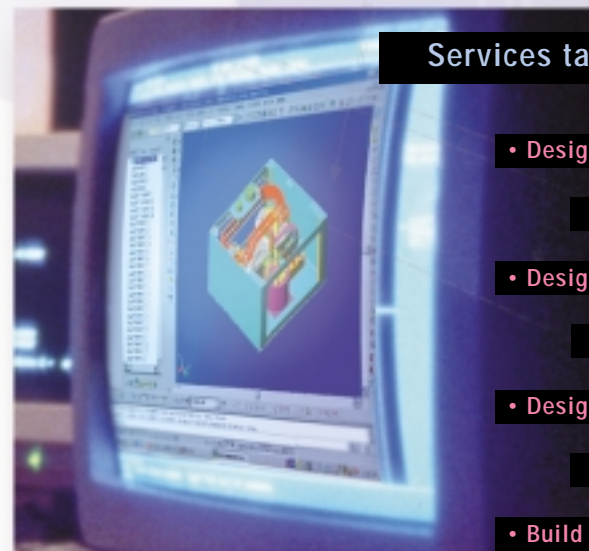
Full-range PDA Design Capabilities

No matter the level of design service required, Leach International has the engineering and manufacturing expertise to handle the job. Plus, use of the latest technological advances enables the company to emphasize economies in weight and cost while ensuring long-term durability and reliable performance.

Engineering strengths encompass enclosure packaging and PCB design, component selection, switching (both solid-state and electromechanical), sensing and control, communication, and conditioning. All Leach International designs benefit from the company's extensive experience and state-of-the-art design tools. Included are the latest in CAD, magnetic and thermal analysis, and FMECA and reliability calculations.

Services tailored to customer needs:

- **Design to Requirement**
Full design, development, integration and qualification
- **Design to Specification**
Full design, development and qualification
- **Design to Replace**
Joint design with customer, development and qualification
- **Build to Print**
Development of product per existing design



Leach International combines the highest quality PDA services with the lowest overall cost to the end user.

AC and DC

Primary Power Distribution Assemblies

Leach International's engineering and manufacturing expertise is perfectly suited to specific aspects of PDA manufacturing. These include enclosure or "baseplate" assembly, PCB and hybrid layouts, hermetic packaging, lightweight and rugged construction, creation of magnetic circuits, and selection of materials. The company's packaging capabilities run from simple to complex. Assemblies can include one or more fully segregated compartments, can be ventilated or environmentally sealed, and specially manufactured to meet a full range of other requirements. Leach PDAs also can incorporate built-in-test (BIT), current sensing, circuit protection, and various types of logic and protection control.

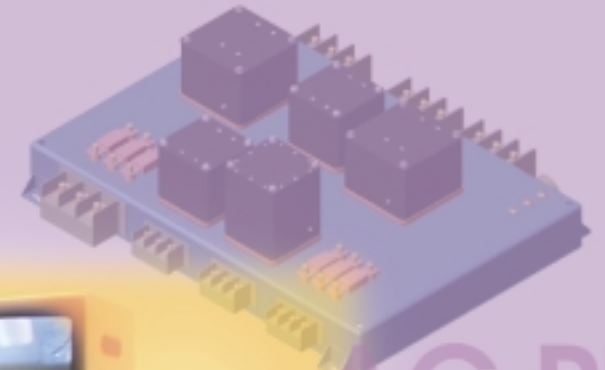
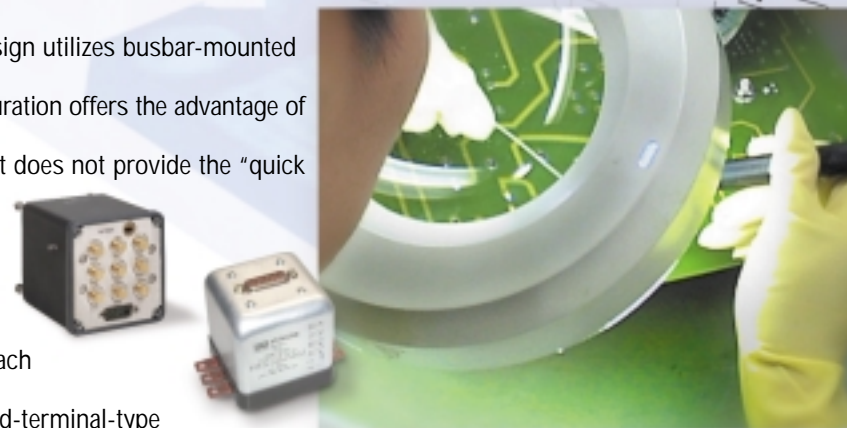
As the world's leading manufacturer of aircraft relays, SSPCs and contactors, Leach International offers numerous advantages over other equipment manufacturers. Low cost, significant weight and size reduction, fast design turnaround time, focused and optimized component selection, thermal balance, and structural integrity all are benefits inherent in Leach PDAs. In addition, Leach can customize one or more components to suit a particular packaging requirement.

AC

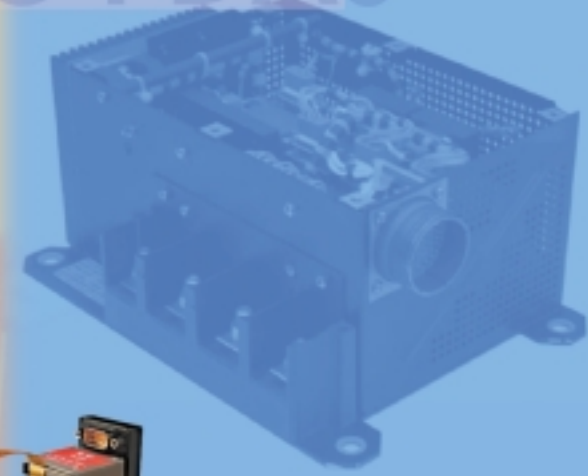
Three sophisticated manufacturing techniques are used in producing Leach International's AC PDAs. The first incorporates a modular approach wherein a "baseplate" containing plug-in receptacles, current transformers, busbars, etc., is designed into the aircraft assembly. State-of-the-art, line-replaceable plug-in contactors are then utilized.

Another "baseplate-type" design utilizes busbar-mounted contactors. While this configuration offers the advantage of better thermal optimization, it does not provide the "quick change" convenience associated with plug-in contactors.

Finally, a conventional approach uses hermetically sealed, stud-terminal-type contactors. Advantages are lighter overall weight and the ability to function outside the pressurized zone of an aircraft. With this configuration, however, the entire PDA usually must be a line-replaceable unit (LRU).



AC PDAs
DC PDAs



DC

Leach International utilizes two methods in the manufacture of DC PDAs. The first incorporates 400-amp busbar-mounted contactors, which minimize the electrical load junctions in the system. The company also has the advantage of being able to offer Hall Effect sensing circuits, which can be tailored to system protection and measurement requirements.

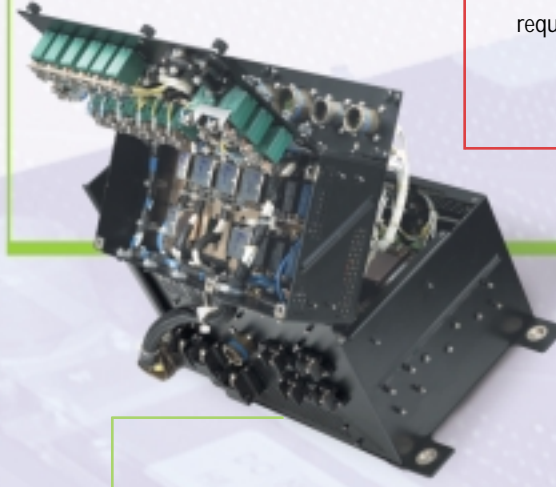
The second method uses hermetically sealed stud-terminal-type contactors. Leach International also can integrate high-current solid-state switching and protection into assemblies as required.

Leach International PDAs—

Uniting Design Excellence and Manufacturing Expertise

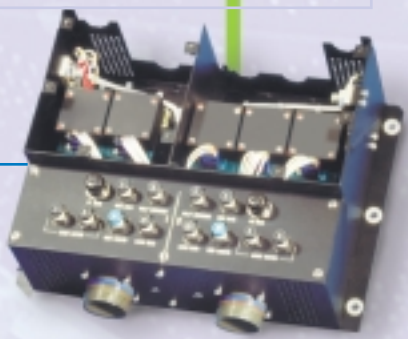
A partial list of Leach International's custom-product customers:

- AEROSPATIALE MATRA S. A.
- AGUSTA S. P. A.
- AIRBUS INTEGRATED COMPANY
- AUXILEC S. A.
- BAE SYSTEMS PLC
- BELL HELICOPTER TEXTRON
- BOEING COMPANY
- BOMBARDIER, INC.
- DASSAULT INDUSTRIE
- DORNIER LUFTFAHRT GMBH
- ERICSSON SAAB
- EUROCOPTER S. A.
- EUROPEAN AERONAUTIC DEFENSE AND SPACE COMPANY
- FOKKER ELMO B. V.
- GENERAL DYNAMICS CORPORATION
- GKN WESTLAND
- HONEYWELL
- ILYUSHIN AVIATION COMPLEX
- KOREAN AEROSPACE INDUSTRIES LTD.
- LOCKHEED MARTIN CORPORATION
- NASA
- NORTHROP GRUMMAN
- PILATUS AIRCRAFT LTD.
- RAYTHEON COMPANY
- ROCKWELL INTERNATIONAL CORPORATION
- SMITHS INDUSTRIES AEROSPACE
- THALES



This DC PDA (28 VDC) is designed to fit tight packaging constraints on a military attack aircraft. Its unique hinged design allows easy access to the DC busbar contactors, as well as to the relays and circuit breakers in the secondary distribution part of the assembly.

Designed to meet the critical lightweight demands of a tiltrotor application, this DC PDA (28 VDC) contains DC busbar contactors rated at 400 amps. Unique to this assembly is the inclusion of advanced Hall Effect sensing to meet current monitoring and protection requirements.



A prime example of Leach International's "design to specifications" expertise, this DC PDA (28 VDC) is used in a small helicopter where cost and weight are key considerations. It benefits from the advantages of lightweight 400-amp busbar contactors, and it includes minimized high-current interfaces and circuit breakers.



This "design to requirement" application is a DC PDA (28 VDC) that fulfills a four-channel separation integrity requirement on a military transport aircraft. It contains 15 DC busbar contactors rated at 400 amps. It contains two dual-redundant bus controls, and monitoring and BIT circuits assembled on two removable PCBs. These PCBs are integrated into the assembly as separate LRUs.



An example of Leach International's AC PDAs (115/200 VAC), this assembly is designed to an existing specification for a regional jet application. It contains two generator contactors, an external power contactor and TRUs switching. It also includes control and protection interlocks.



This modular AC PDA design (115/200 VAC) contains AC plug-in contactors, both with and without protection, as LRUs. It is mounted on a customized base assembly with busbars and aircraft interconnects.



This AC PDA (115/200 VAC) is designed to the specifications of a lightweight, robust aircraft application. It is an LRU mounted outside the pressurized zone of the aircraft and contains hermetically sealed contactors.



This DC PDA (28 VDC) is unique in that the secondary distribution portion, which contains circuit breakers, is a plug-in module that can be removed as a separate LRU. Designed in conjunction with a generator system manufacturer for a helicopter application, this assembly contains busbar contactors and sensing along with the GCU.

These are just some examples of the many PDAs Leach International has developed for its customers. Because every application is unique, Leach engineers are prepared to discuss in detail a customer's requirements and explore how those needs can best be met.

Leach Capabilities

ELECTRICAL DESIGN

- Analog and Digital Design (FPGA, ASIC)
- Microprocessor Design
- Software Design
- Solid-state Switching
- Sense & Control (CT, Hall Effect, I²t Tripping)
- EMI
- Reliability Prediction (FMEA, FMECA, Fault Tree)
- Automated Test Equipment Design
 - Hardware
 - Software

MECHANICAL DESIGN

- Relay Design
- Contactors Design
- Tooling & Fixture Design
- Magnetic Design
- Finite Element Analysis
 - Structural Analysis
 - Thermal Analysis

PACKAGING DESIGN

- Printed Circuit Board Layout
- Hybrid (Thick Film/Chip & Wire) Layout
- Smart Contactors
- Electrical Panels
- Relay Panels
- Power Distribution Assemblies
 - (Primary & Secondary)
- Harness Design
- Material & Processes

LEACH[®] *INTERNATIONAL*

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