

## B&C SPECIALTY PRODUCTS

"Treat Yourself to the Best!"

# QUICK FACTS

VOLUME 1, NUMBER 6      JUNE 2004

## MORE THAN JUST ANOTHER REGULATOR

The LR3C Controller combines three essential devices in one physical container, making it a lightweight, space-saving, and cost-effective alternative for any aircraft electrical system.

First, the LR3C functions as a "quiet," linear regulator, generating no electrical noise (this in contrast to switching-type regulators). Second, it provides a vital safeguard for your electrical system with a solid-state, "crowbar" over-voltage protection circuit. And third, it contains a low-voltage detection circuit that illuminates a panel-mounted warning light whenever bus voltage drops below 12.5v (or below 24.5v on a 28v system).

The LR3C features field-adjustable volt-

age output, via a 20-turn precision potentiometer, to insure proper charging voltage. It weighs approximately 9 ounces, and may be mounted on the cockpit side of the firewall. It is also available with an optional battery temperature sensor—ideal for aircraft operating in colder climates.

The LR3C-14 is designed for use with 14v, externally-regulated alternators using a Type-B circuit ("Application Notes," pg. 2). The LR3C-28 is intended for 28v, externally-regulated, OEM alternators using a Type-B circuit.

*Note: wound-field B&C Alternators (such as the L-60, L-40, SD-20, SK-35, SK-50, or LOM30) intended for use in a 28v system require the LS-1A Controller. Please call for details.*

## OV/LV PROTECTION: ESSENTIAL FOR SAFETY

Discussions of over-voltage and low-voltage events are not merely the aviation industry equivalent of "Dark and Stormy Night" stories—good for a tingle down the spine, but unlikely in the waking world. The simple truth is that such situations can occur. And when they do, aircraft without adequate protection—and those flying them—are placed in very real jeopardy.

The LR3C Controller is designed with these real-world concerns in mind.

Protection from over-voltage (OV) events is provided by a built-in solid-state, "crowbar" over-voltage circuit; a technology adapted from the

computer industry that instantaneously—and automatically—takes the alternator off-line in the event of an OV problem.

Low-voltage (LV) events, caused by a broken alternator belt or a faulty field wire, also represent a serious concern. Safety of flight can be significantly compromised in these situations, especially if the condition continues unobserved. The LR3C offers protection from these events through its low-voltage detection circuitry. A panel-mounted warning light (included) announces the LV condition—providing a visual indication of the need to conserve vital battery power.

### FEATURES:

- Linear ("quiet") regulation — no radio or headset noise
- Solid-state, "Crowbar" over-voltage protection
- Low-voltage warning circuit with clear-yellow warning light
- Voltage adjustable: 13.0-16.0v
- Designed to DO-160R category Z specifications for RFI emission, and voltage and spike limits; and DO-160 category 5, curve T, spec for vibration limits
- Altitude rated: -1,000 to 30,000 feet
- Total weight: 9 ounces

### PRICING

LR3C-14 Controller, 14v (Homebuilt), for Type "B" 14v Alternators	\$228
---	-------

LR3C-28 Controller, 28v (Homebuilt), for OEM 28v Alternators	\$230
--	-------

Battery Temperature Probe (optional)	\$90
--------------------------------------	------

### ALSO OF INTEREST

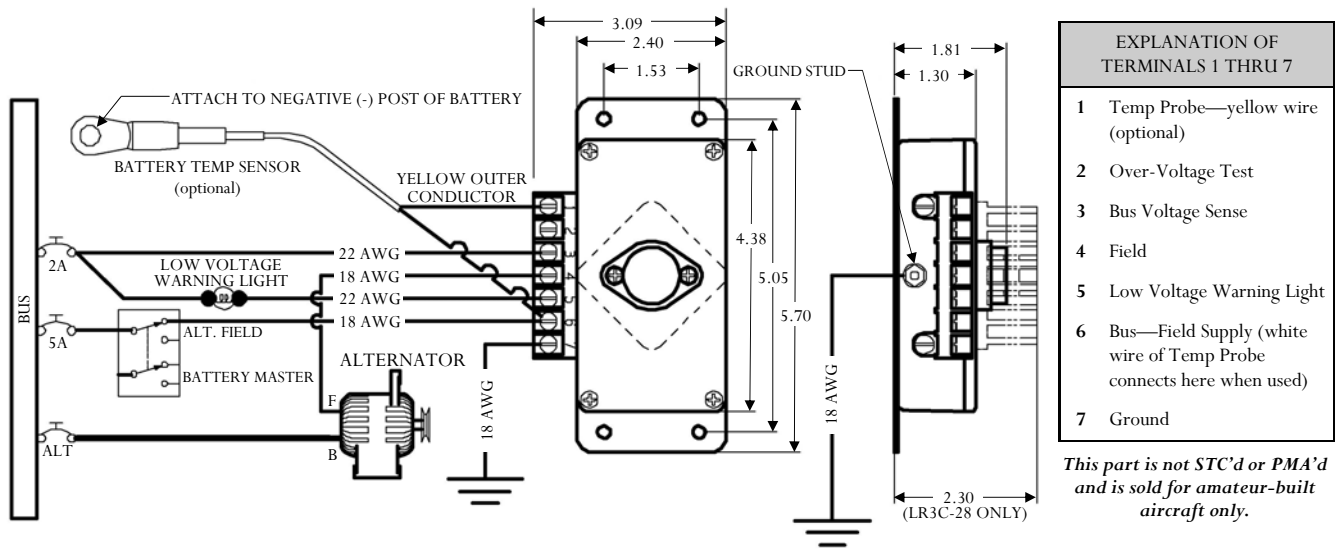
LS-1A Controller, 28v (Homebuilt), for B&C 28v Alternators	\$268
--	-------

### SEE PAGE 2 FOR:

- LR3C Dimensions and Wiring
- The Benefits of Linear Regulation
- Application Notes: Type A or Type B?



## LR3C DIMENSIONS AND WIRING



## THE BENEFITS OF LINEAR REGULATION

The most common type of regulator found in use today is the “switching” variety—known for the way in which it switches “on” or “off” in order to regulate electrical current. In fact, a switching regulator commonly performs this on-off function many hundreds of times per second under normal operating conditions. While switching regulators are compact, and inexpensive to produce, they do have drawbacks—mainly, the many “pulses” of the on-off switching creates electrical noise. As a result, the conventional wisdom has been to

locate the regulator as far away from the radio gear as practical. Often, that meant putting the regulator on the engine side of the firewall—and exposing its electronics to the hostile operating temperatures found there.

Enter the “linear” regulator—a device that controls regulator output by adjusting alternator voltage, without ever turning the output completely off. In operation, then, it is more like a “dimmer” than an on-off switch, reaching its desired operating voltage in a smooth—and electrically “quiet”—

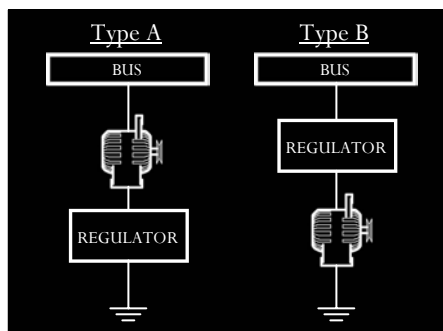
fashion instead of through distinct on-off switching.

This is where the benefits of a linear regulator emerge. Since linear regulation is “quiet” from an electrical standpoint, the need to locate the regulator in the engine compartment ends. This permits locating it on the cockpit-side of the firewall—a more temperature-friendly environment. Moreover, when mounted in this location, the regulator may be wired into the aircraft electrical system with greater convenience, and with fewer wires through the firewall.

## APPLICATION NOTES: TYPE A OR TYPE B?

One potential challenge in selecting a new regulator stems from the fact that two types of alternator systems are used in modern aircraft; these are commonly called “Type-A” and “Type-B” systems.

The difference between the two is a matter of system architecture—essentially, where the regulator was designed to function in the electrical system. As the diagram illustrates, the Type-A system (a.k.a. the “Motorola system”) drives the alternator field



directly from the electrical bus; the field is then connected to the regulator,

and ultimately, to ground. In contrast, a Type-B system has the bus connected to the regulator *first*, after which the system is connected to the alternator field (and again, ultimately to ground).

The LR3C Controller is compatible with Type-B alternators only. Installations involving an existing alternator should proceed only after a careful system review.

*Note: all B&C wound-field Alternators are Type-B.*