

HOW TO BUILD YOUR OWN AMPLIFIER RACK

CAR STEREO

THE MOBILE ELECTRONICS AUTHORITY

REVIEW

Radio Races

9 CD Heads Tested Head To Head

EVERYDAY PEOPLE

Daily-Driver Systems In A Chevy Astrovan, Olds Calais, And Honda Accord



JULY 1998
USA \$3.99
CANADA \$4.99
UK £2.50



Cap Dance

Tested: Lightning Audio capacitor and isolator, Omega vehicle pager BY MICHAEL MICHNAY & MICAH SHEVELOFF

Lightning Audio Storm SDM1.0 Capacitor and Strike ISO240 Isolator

WELCOME TO 12-VOLT POWER 301. I'M PROFESSOR ELECTRICITY, and I'll be your host for another exciting lesson on power delivery in the 12-volt environment. In our first session, 12-Volt Power 101, we covered proper electrical wiring and the basics of charge [Parts & Security, "Power Records," May 1998]. In the following session, 12-Volt Power 201, we examined the sources of your vehicle's electrical power—the alternator and the battery—and the importance of choosing a source with the proper electrical output for your car and system's specific needs [Parts & Security, "Ampere Group," June 1998]. In the third, and final, part of this electrifying educational series, I'm going to show you how to elevate your electrical system to audiophile standards.

To bring your electrical system up to audiophile snuff, we need to establish a separate power reserve that's dedicated to the sound system and isolated from your vehicle's electrical system (except for its connection to the alternator). Doing this will ensure that your sound system will have enough energy to operate at peak efficiency regardless of your vehicle's power needs or desires.

Excited to get to it, I made a beeline to my rolling test lab—in this case, my buddy's 1997 GMC Yukon. I chose the Yukon because it was already prepped with the necessary electrical upgrades discussed in both 12-Volt Power 101 and 201. I should emphasize that the upgrades outlined in 12-Volt Power 101 and 201 should be completed before you even consider moving on to 12-Volt Power 301.

Three items are necessary to make this upgrade happen: 1) a second battery to serve as the backup energy reserve, 2) a battery isolator to sequester that power reserve from the vehicle's electrical system, and 3) a capacitor to give your sound system the extra *oomph* it may need to reproduce dynamic musical passages. (While some may argue the value of a capacitor in this situation, I happen to think it enhances system-operating efficiency.)

Because Lightning Audio gear was already used to upgrade the Yukon's power plant (as detailed last issue), I decided to go

with Lightning Audio product for this upgrade so that everything under the Yukon's hood would match cosmetically.

My first course of action was to install a Lightning Audio Storm SDM1.0 1-farad capacitor (\$299). A capacitor is basically a high-efficiency storage cell with a high discharge rate. If your sound system needs a quick boost of energy to reproduce a particularly boomin' musical passage, for example, a capacitor can deliver that boost within a fraction of a second so that your system's amplifier won't clip and choke on the music. The SDM1.0 features a brushed-aluminum finish and a digital voltmeter (or "digital monitor," as Lightning calls it) that's built into the top of the capacitor. The digital monitor reads overall voltage at the capacitor down to 0.01 of a volt.

I mounted the SDM1.0 right next to the Yukon system's amplifier and wired it up with 8-gauge power wire. Then I extended a wire from the amp's remote-turn-on lead to the digital monitor's remote-turn-on terminal so that the monitor will illuminate whenever the sound system is engaged. If the SDM1.0 is correctly wired into a system, the digital monitor will provide a good indicator of the amount of voltage reaching your amplifier(s).

Adding an auxiliary battery was next on the upgrade agenda. Since the Yukon's stock battery (which, you'll recall, was removed last month in 12-Volt Power 201 and replaced with a Lightning Audio Storm SBX1500 Lightning Cell battery with a built-in digital monitor) was still good, I decided to save money and return it to its rightful place in the stock-battery locale so it could serve as the Yukon's power reserve. This, however, meant displacing the SBX1500, which could now be used to handle the power-reserve needs of the sound system.

Finding a new home for the SBX1500 was easy. The Yukon is equipped with an auxiliary-battery compartment on the driver's side of the engine that's intended for use with the Yukon's diesel-engine option. Since this particular Yukon isn't a diesel, the compartment was empty.

Bingo. The compact SBX1500, which measures 6.8 x 9.7 x 5.2 inches (h/w/d), fit perfectly. However, the SBX1500's high-tech case design left no place for the Yukon's OEM hold-down clamps to grab onto. As a result, I had to fabricate a custom clamp to hold the battery in place.

Connecting both batteries to the alternator was a



Rally caps: These Lightning Audio capacitors enable audiophile-grade performance

fairly simple procedure. Generally speaking, there are 2 ways to connect 2 batteries to a single alternator. The most economical way is to use a high-current solenoid. In this configuration, the batteries are essentially run in parallel to act as one giant power reserve, but aren't electrically isolated from one another. That means if something happens to one battery while the engine is running, it happens to the other one as well; i.e., if one battery runs dead, the other one does, too. When the vehicle's ignition switch is in the accessory or off position, however, the batteries are isolated.

The second method, which I prefer, is to use a dual-battery isolator. An isolator works as an electrical check valve to allow charge to flow in one direction only. Positive charge flows from the alternator to the isolator, where it's split up between the 2 batteries. The isolator restricts charge from flowing between the 2 batteries, and you get 2 completely separate energy reserves. If you're really wailing with the stereo system and drawing an excessive amount of energy from the alternator, the vehicle's factory-installed electronics won't be as likely to be affected by any voltage swings, and vice versa.

I vertically mounted a Lightning Strike ISO240 240-ampere isolator (\$239) lengthwise next to the stock battery using a custom bracket. Removing the alternator output cable from the stock battery's positive terminal, I attached it to the isolator's input terminal. Then I ran a 2-gauge power cable from each battery's positive terminal to a corresponding output connector on the ISO240. Finally, I attached the vehicle's ignition wire to the isolator's fourth input terminal. Job complete.

With all of the connections secure, I dragged out my trusty Cornwell FI40 battery/charging analyzer to verify that our dual-battery system was functioning as intended. With the engine turned off, each battery registered a charge of 12.5 volts. With the Yukon's engine fired up and running at idle, the reading jumped to 14.6 volts.

I then verified that the 2 batteries were truly isolated by increasing the load on the stock battery with the FI40's built-in load resistor. Using the FI40's amp meter, I found that the loaded-down stock battery received proportionately more energy from the alternator, while the

SBX1500's draw remained constant. To be thorough, I loaded down the SBX1500 and got similar results.

Looking back over our 3-pronged lesson plan, I can definitely conclude that our power-delivery upgrade project was a rousing success. The Yukon's sound system now has its own energy reserve and can operate independent of and unaffected by the operation of its other mobile-electronic devices. Class dismissed.

—Michael Michnay
Lightning Audio, Dept CSR, 1835 E. 6th St., Ste. 6, Tempe, AZ 85281; 602-966-8278. Web site: www.lightningaudio.com.
Circle 150 on reader-service card



Command performance:
Omega's CommandLink lets you page your car

Omega Research CommandLink System Vehicle Pager

IT'S A BEAUTIFUL SATURDAY MORNING. The sun is shining, the birds are chirping, and the dogwood trees that line the Belt Parkway are in full bloom. You're behind the wheel of a souped-up red Porsche that you've just, shall we say, "liberated." You're now focused on the road ahead and how wonderful Led Zeppelin's "Ramble On," from *Led Zeppelin II* (AKA *The Brown Bomber*), sounds on the Porsche's stereo system. Suddenly, your bliss is shattered—the Porsche's horn starts blaring, the lights start flashing, and the power door locks power up and down all by themselves. You wonder

what the hell's going on; you thought you got away with stealing this car scot-free. Sorry, pal—like it or not, you've just experienced the wrath of Omega Research's new CommandLink System vehicle pager.

Built around Motorola's CreaLink wireless-control module, Omega's CommandLink (\$149; plus a \$50 minimum installation fee) literally puts vehicle owners on speaking terms with their cars. CommandLink is, in effect, a pager for your car. It lets you send simple commands via telephone or the Internet (specifically, www.wirelessweb.com) to control strategic electrical circuits, powered features, and other convenience-oriented options within your vehicle.

For example, if you lock your keys in the car, all you have to do is call the toll-free number, punch in a few buttons, and, within minutes, your car's doors will unlock all by themselves. And that's just one of the CommandLink's many practical features; others include starter-circuit disable, door lock/unlock, and remote start.

CommandLink can be wired to the electrical system of virtually any automobile (some more easily than others, of course). I decided to give it a go in a friend's 1994 Toyota Corolla.

Getting down to it, I spread the contents of the CommandLink's small box on my workbench. The box contained a control unit (or brain), a wire harness, and all of the necessary instruction manuals. The CommandLink's brain is ultra-compact and easy to conceal. The reason it's so compact is because there aren't any relays inside the control unit itself. Nevertheless, relays are necessary to transfer the low-current messages from the CommandLink module to the different automotive operative systems they may trigger. Since they're not included with the kit, they must be added during installation. (Relays can cost anywhere from \$5 to \$10 apiece.)

Before initiating the test, I needed to prep the Corolla. It was without power door locks, so I added servos to automate the door lock/unlock functions. I also outfitted the vehicle with an Omega RS-4LX remote starter (\$100; plus installation); to trigger the CommandLink's remote-starter capability, you

must, naturally, have an aftermarket remote starter installed in your ride. Once all that was taken care of, I checked to see how many relays I'd need to complete the install. Luckily, the Corolla has

negative-trigger parking-light and horn circuits, eliminating the need for those 2 relays. Good deal. However, the starter-kill and door-lock/unlock functions did require them. So, for this particular in-

stall, a total of 3 relays were required; you may need more or less depending on the make and model of your vehicle.

Once the physical installation was complete, I initialized the module's over-the-air paging system by calling the CommandLink Center. During this call, an attendant will ask for the 8-digit PIN number that's found on the control-module identification card, a credit-card number, and your home phone number and zip code. You'll also be asked to select a 4-digit non-sequential security code. A total of \$60 (plus tax) will be charged to your credit card at the time of this call—\$35 of the fee covers a year of airtime service, the remaining \$25 goes toward a one-time activation fee. The yearly airtime charge includes up to 30 broadcast commands per month; each additional broadcast costs 25 cents and will be billed periodically to your credit card.

The CommandLink Center's automated phone service lets you access up to 9 possible commands via your phone's keypad. Press 1 to unlock the doors, 2 to lock the doors, 3 to locate the vehicle (the lights flash and horn honks for 30 seconds), 4 to remotely start the vehicle (remember, as I said before, a remote-start unit is required for this command), 5 to activate the stolen/hijacked-vehicle mode (which will cause the horn to honk, lights to flash, and doors to lock and unlock at will, as well as activate the starter-circuit disable), 6 to open the trunk, 7 to disable the vehicle's starter circuit, 8 to reset the system, and 9 to activate a custom feature (which enables you to control selected options installed on your vehicle, such as closing a convertible top or activating a car-stereo system).

To engage the system, just dial the CommandLink's toll-free number. The automated operator asks for the aforementioned 8-digit PIN number and the 4-digit security code. These numbers can be conveniently stored on a plastic-coated wallet card supplied with the device. Once the PIN and security numbers have been entered, the operator asks for the digit of the command you want implemented. A few minutes after you hang up the phone, the requested function is activated. I found the time it took the command number I punched in to get to the Corolla varied between 3 to 6 minutes. I experienced no instances of failed com-

HIGH END CAR AUDIO ACCESSORIES AT FAIR, COMPETITIVE PRICES



We Are...

leading the industry in the manufacture of Quality High End Car Stereo Installation Accessories and the development of Digital OEM Interface Devices

We Are...



Precision Interface Electronics

PIE SITE MAP

1997 Virtual Catalog

OEM Interface Application Guide

Featured Installation

New Dealer Applications

Meet Team P.I.E.

Technical Support

Contact Us

Link Up

Precision Interface Electronics, Inc. has a full line of Match The Amp Stiffening Capacitors. Choose from the standard, yet colorful capacitors or step up to our new line with your choice of Top Mounted Power Distribution Block, Top Mounted Light Bar, or Top Mounted Digital Monitor

PIE Virtual Catalog



Capacitors

Page Down For Menu

Back To Virtual Catalog Index

To Next Page

Check out our Web Sites' Virtual Catalog for details on our entire line of Match the Amp Capacitors. If you don't find what you need, E-Mail us and we'll let you know what's on our slate for 1998.



OEM Interface Application Guide [Return Home](#) New Dealer Application Meet Team P.I.E. Tech Support [Contact Us](#)

M1A Capacitors

M1B Capacitors Half Size

M1A Capacitors With Distribution Blocks

M1A Capacitors With Light Bar

M1B Capacitors With Digital Monitor

Capacitor Hardware



WEB SITE: <http://www.pie.net> E-MAIL: questions@pie.net

CIRCLE NO. 83 ON READER SERVICE CARD

AD INDEX

How To Locate & Contact Advertisers In This Issue

| PAGE | ADVERTISER | WEB SITE | PHONE NUMBER |
|--------|---------------------------------------|--|--------------|
| 53 | Alpine | www.alpine1.com | 800-257-4631 |
| 14 | Audiovox | www.audiovox.com | 516-231-7750 |
| 36 | Aura | www.aurasystems.com | 310-643-5300 |
| 4 | Bel-Tronics | — | 800-341-1401 |
| 8-9 | Boston Acoustics | www.bostonacoustics.com/boston | 978-538-5000 |
| 34 | Cambridge SoundWorks | www.hifi.com | 800-367-4434 |
| 77 | Clifford | www.clifford.com | 800-254-3367 |
| 24a,b | Columbia House | www.playfromcolumbia-house.com | — |
| 33 | Coustic | www.coustic.com | 213-582-2832 |
| 62 | Crutchfield | www.crutchfield.com | 800-955-9009 |
| 89 | Directed Electronics (DEI) | www.directed.com | 760-598-6200 |
| 27, C4 | Esoteric Audio | www.eau.com | 800-806-6111 |
| 12 | Fittipaldi Wheels | — | 888-434-8847 |
| 46 | G-faKt Solutions | www.g-fakt.com | 602-496-8961 |
| 81 | J&R Music World | www.jandr.com | 800-221-8180 |
| 17 | JBC | www.jbc-usa.com | 800-343-9937 |
| 31 | JL Audio | www.jlaudio.com | 954-981-9497 |
| 7 | JVC | www.jvc.com | 800-526-5308 |
| 35 | Lanzar | www.audiowarehouse.com | 718-236-8000 |
| 21 | MB Quart | www.mbquart.com | 508-668-8973 |
| 41 | Mobile Dynamics | www.mobiledynamics.com | 800-610-2122 |
| 82 | Morel Acoustics | www.gis.net/~morelusa | 617-277-6663 |
| 61 | Nakamichi | www.nakamichiusa.com | 310-538-8150 |
| 83 | NuReality | www.nureality.com | 714-442-1080 |
| 19 | Panasonic | www.panasonic.com | 201-348-9090 |
| 92 | PanDisc Music | — | 305-557-1914 |
| 47 | Paramount Audio | www.crossfirecaraudio.com | 562-483-8111 |
| 29 | Pioneer | www.pioneerelectronics.com | 800-746-6337 |
| 88 | Precision Interface Electronics (PIE) | www.pie.net | 800-256-8590 |
| 73 | Pro Sound & Stage Lighting | www.pssl.com | 800-672-4268 |
| 2-3 | Sony | www.sony.com | 800-222-7669 |
| 74 | Sound City | www.soundcity.com | 800-542-7283 |
| 11 | Soundstream | www.soundstream.com | 916-351-1288 |
| 13, C3 | Stillwater Designs | www.kicker.com | 800-256-5425 |

parts & security

munications or any other malfunctions during my CommandLink test.

After playing with the CommandLink for awhile, it's obvious to me that it's part security system and part ultraconvenience device. The stolen-car mode, which flashes the parking lights, sounds the horn, and continuously attempts to lock the doors, is a very cool feature indeed. Of course, its usefulness will depend entirely on the resourcefulness of the thief and how long it takes a law-enforcement official to notice and respond to the flailing vehicle. The CommandLink's convenience features are key selling points for motorists who lock their keys inside their cars and for folks who live in extreme climates who can take advantage of the remote-start and custom options to make their automobiles more comfortable by way of a simple phone call.

Omega says installation of the CommandLink will cost at least \$50. Hmm. It took me 3 hours to install just the CommandLink module in the Corolla, which would cost the customer about \$200, including parts and labor. Obviously, the installation cost will vary based on the type of vehicle you have and the features you want.

One very important point: The Omega CommandLink is best suited as a supplemental security device, added to either a factory or aftermarket alarm system. It's not designed to be your vehicle's stand-alone security device. Now I'm sure that some people won't want to go through the hassle of calling the toll-free number every time they park their car to interrupt the starter circuit, though it would certainly be prudent to do so. Regardless, the CommandLink's awesome array of convenience features make it a very intriguing product and one worth your time and consideration. Don't believe me? Just ask the poor sap who tried to make off with that Porsche.

—Micah Sheveloff
Omega Research, Dept. CSR, Box 508,
Douglasville, GA 30133; 800-554-4053.
Web site: www.caralarm.com. Circle 151
on reader-service card ■

Michael Michnay is the owner of Mobile Electronics Specialties in Hyannis, Massachusetts, and, when he's not jetting off to Hawaii, can be reached at CarSteRev@aol.com. Micah Sheveloff is the owner of Audio Coupe in Fairfield, Connecticut, and he welcomes questions about sound, security, and Cheap Trick at Popdoggie@aol.com.