

CURRENT EVENTS



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Promoting the use of electric vehicles since 1967

VOL 28 No. 10

2001 - An EV Carpool Odyssey

BY CLARE BELL

Pioneering EV drivers, take heart. Help is coming. The state of California may soon let you run in the diamond carpool lane. Spurred by pressure from General Motors on behalf of its EV1, the California Legislature passed AB 2282, a bill giving EVs access to the diamond carpool lanes until Jan 1, 2001.

The bill passed, 26-9 on 8/22, and went to the Assembly for vote on Senate amendments.

The Legislature's move was a surprising one, coming on the heels of a similar bill that was rejected a few weeks earlier. Having GM step into the picture undoubtedly helped reverse legislators' attitudes. Of course GM gets something out of this too. Carpool lane access during commute hours is a perk that makes the EV1 even more attractive to potential customers.

The EV1 is not the only potential carpool-laner. Many EAA conversion cars have more than enough power to sustain freeway speeds. Hopefully carpool privileges will help make the less expensive conversion EVs more attractive to those who can't afford the EV1.

Even though the bill has passed, however, it still faces some obstacles.

Possible Wilson Veto

The oil industry and CALTRANS have opposed the bill, claiming the new freeway signage and driver education would cost too much to implement.

Pressure on Governor Wilson could make him stop it cold with a veto, requiring an overriding vote in the Legislature. EV owners and advocates should write in support of the bill (see sidebar on p. 5).



Fleet EVs Only?

Another possible big bump in the road is Federal Highway Administration policy. According to Kyle Davis of Southern California Edison, the Feds say that only "fleet" ILEVs (Inherently Low Emission Vehicles) can have diamond-lane access. This decision was made by EPA as part of the Intermodal Surface Transportation Act of 1991(also known as ISTEA.)

Southern California Edison, assisted by GM, is working to have "public" EVs added to the Federal definition, according to Davis. This would prevent the Feds from overruling the California law.

Sources: Kyle Davis, Southern California Edison, <DAVISK1@OFC005B.SCE.COM

THE SACRAMENTO SUMMARY—A Summary Of Major Action
Associated Press, Tel# 415-621-7432.
Contact: Steve Elliot for Email Web access for AP.

EVDL news post from: Bruce {EVangel} Parmenter <brucedp@JUNO.COM

Many EAA conversion cars have more than enough power to sustain freeway speeds.

1 **2001 - An EV Carpool Odyssey.** EVs may soon be launching into the carpool lane. With the help from GM, we're embarking on AB2282.

3 **Editorial—New Zaps.** EVs are under fire again from expected sources, such as Peter Passell of the *New York Times*, and those we didn't know, such as *Consumer Reports*. CE Zaps back.

4 **Click-Charging from CALSTART.** Need a quick amp fillup? Click-charge to the nearest charging location courtesy of CALSTART's website.

5 **Write Wilson for Carpool Lane Access.** CE Urges EAA members to contact Pete Wilson about AB2282. And if you want to do more, participate in or organize an EV freeway demo run. Slow cars in the fast lane? No fear!

6 **New Optimas Improve ACP Honda Range 23%.** AC Propulsion's Honda is already a gas-car-eater and would be a prime diamond land candidate. Having been newly Optima-ized, it's even better.

8 **Batteries — An OPTIMA Group Buy, SF Area.** An Optima in your future? Maybe through EAA San Jose.

12 **One Day in the Life of an EV Battery.** 153.7 miles in one day in a Grumman postal van? Stan Skokan tells how, with enough graphic data to warm a techie's heart.

Managing Editor

Clare Bell
544 Summit Drive
Santa Cruz, CA 95060
Tele: (408) 469-9185
Fax: (408) 469-3714

Contributing Authors

Clare Bell
Stan Skokan
AC Propulsion,
Kyle Davis,
Dave Sotero
Marty Bernard
Bruce Parmenter

News In Brief

Ruth Shipley

Calendar of Events

Kathy Watson
Lanette Racine

Photography Credits

Bob Wheeler

Advertising/Design/Printing

Susan A. Hollis (PCTEK)
Fax: (408) 374-8750
18297 Baylor Avenue
Saratoga, CA 95070

Article Submissions

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Advertisements

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Membership/Address Changes

For information on new membership or change of address, please send your requests to:

EAA Membership
2710 St. Giles Lane
Mountain View, CA 94040

PHOTO CREDIT - PAGE 1

Cocconi Honda - AC Propulsion's (Allan Cocconi's) Honda CRX EV is a prime carpool lane candidate—and it also set a recent test record of 145 miles per charge on Optimas (see page 6) Photo credit: Rich Hilerman

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New Zaps

by Clare Bell

The opposition seems to be throwing thunderbolts again. Just as CE was wrapping up editorial production, your editor was alerted to two anti-EV statements in the media.

A Passell of Problems

The first, as might be expected, is from our old Carnegie-Mellon friend Lester Lave and found its way into the New York Times by way of writer Peter Passell. Passell was responsible for getting the original "Bad News from New York Times" into print without checking the validity (or the funding sources) of the now infamous and discredited Carnegie-Mellon study. This time, Environmental Science and Technology became the original mouthpiece for Lave's poor science and misinformation. Passell then stuck it into the NYT.

What Passell and the New York Times did not say is that Lave and his cohorts are supported by a gusher of oil company money. He is as much a paid mouthpiece for the industry as any lobbyist. The proof is available and publicly accessible. We printed it in the July 1995 CE and the EV Buyer's Guide. Respected organizations such as the Union of Concerned Scientists have repeatedly debunked Lave's claims and shown him up for what he is: a hireling of the petroleum industry.

How can the Times give Lave any credibility at all? And how can they continue to publish Passell's pieces when the source of his information has been proven WRONG? When a writer makes an error, or a mistake in judgement he should have the grace to admit so, and change his tune. He should also allow equal time and space to the other side.

I plan to send a copy of the original CE editorial describing Lave's funding to Passell and his management, asking that it be printed.

CE may be a tiny publication, but we do strive for integrity. If the New York Times won't print the truth about

Carnegie-Mellon and issue an apology and a retraction, they will have forfeited any right to make such a claim.

The Garage Challenge

And to Lave himself, and those who fund him, I offer a very simple challenge. Three hours in a sealed and locked garage with a running vehicle, either gasoline or electric. And all the Chevron, Mobil, Standard, BP and WSPA money won't have anything to do with the choice.

Send this to CU

If it weren't enough, we now have to deal with an attack, from, of all places, Consumers Union. In an otherwise timely and cogent discussion of global warming in the Sept. issue of *Consumer Reports*, they include a one-page sidebar with the header "We try an electric car" accompanied by the statement, "Even if they worked well, they wouldn't help much." Sorry, CU, but that statement is wrong. They do work well and they would help a lot. As for the Solectria Force, you didn't give it a fair trial.

If you had come to a more knowledgeable source than a writer who did not understand EVs and who has obviously not had much experience, the article would have been worthy of your usually high standards. This one was not. Here is why.

Hoary Old (Wrong) Claim

Claiming that EV proponents are indulging in wishful thinking, the article basis its stance on the hoary old claim that EVs just displace carbon dioxide pollution back to the power plants. That is not true because of the following:

1. Power plants, because they run at an optimal continuous speed, are far more efficient than individual gasoline engines. Even with transmission and charging losses, more energy from the combusted fuel reaches the drive wheels of an EV than the drive wheels of a gas car (overall efficiency is 11% for gas, 17%

for EVs). This has been shown over and over again by EPRI, Union of Concerned Scientists and others.

2. The medium of electricity makes EVs able to use power generated from renewable energy sources, such as solar, wind, biomass and others. EVs are not tied to combustible fuels the way that ICE's are. Regions such as California already have percentages of renewably derived power.

3. Each time that technology makes power plants more efficient, EVs automatically become more efficient. And, that technology affects the whole fleet of EVs instantly, whereas effects due to improvements in gas car technology are delayed for as much as a decade due to vehicle replacement rates.

4. Gas car technologies are far less efficient and dirtier than emissions tests show. Cars are not tested under load, under high acceleration, or during high-power output driving, such as passing and hill-climbing. CO2 and other pollutants skyrocket under those conditions.

5. As they age, gas cars become less and less efficient. Poorly tuned engines hog fuel and spew more carbon dioxide. Older drivetrains have higher friction losses.

6. Most of these analyses do not take into account the carbon dioxide produced by support activities for gasoline cars, such as obtaining, refining and transporting liquid fuel.

7. Most of these analyses do not include the carbon dioxide generated by the wars necessary to secure access to gasoline supplies. How much was created when the Kuwait oilfields burned for months?

8. Trying to control the performance of millions of privately owned mobile entities doesn't work. California is starting up Smog Check Two because the smog control measures so far have failed. Trying to ensure that gas cars stay effi-

continued on page 5

Click-Charging from CALSTART

For clean vehicle drivers in need of a quick "fillup", turn to CALSTART. The consortium's website at <http://www.calstart.org> has graphical maps that show nearly 200 EV recharge stations and natural gas refueling sites throughout CA. According to CALSTART's Internet Project Manager Dave Sotero, the EV sites represent hundreds of individual charging ports. All graphically displayed information will be constantly updated. "As clean vehicles enter the marketplace in increasing numbers," says Sotero, "these maps are critical to show existing users and prospective buyers the growing list where they can get a clean "fill up." The sites are there: now it's easy to find them."

Sotero adds, "I encourage everyone to take a look at the maps and offer feedback on making these locations more comprehensive and/or accurate."

Good job, CALSTART! Maybe the other consortia can follow your lead. —CB.

Dave Sotero (dsotero@calstart.org), Internet Project Manager, CALSTART, 3601 Empire Avenue, Burbank, CA 91505. (818) 565-5600 PHONE, (818) 565-5610 FAX

<dsotero@CALSTART.ORG> (8/27/96)

Visit the CALSTART Web Site at <http://www.calstart.org>.

Write Wilson for Carpool Lane Access

Carpool lane access for EVs may be through the Legislature, but it still has to run the gauntlet of the Governor's office. As those of us who followed the fate of the ZEV mandate know, the present California governor has a tendency to bow under pressure from oil and other established interests. However, one of the automakers, GM, has stepped in on our side and may be able to help prevent Wilson from vetoing AB2282.

EAA members can help by writing or emailing the governor's office, urging support of EV diamond-lane access. If you drive an EV that could use the carpool lane, let Wilson know.

Governor Pete Wilson
Capitol Building
Sacramento, CA 95814
Tel: 916-445-2843
Fax: 916-445-4633

AB 2882 Summary

AB 2282 as amended in Senate August 13, 1996:

(Pursuant to Joint Rule 26.5)

AB 2282, as it passed the Assembly, permitted, until January 1, 2001, vehicles certified by the federal Environmental Protection Agency as Inherently Low-Emission Vehicles (ILEV), including all California ILEV vehicles, to use traffic lanes reserved under existing law for high-occupancy vehicles.

The Senate amendments, additionally, do all of the following:

(1) Allow the Commissioner of the California Highway Patrol to approve specified labels or other identification means for vehicles qualified as ILEV, upon petition of the State Air Resources Board.

(2) Authorize the Governor, upon making a specified determination, to exclude certain exclusive and preferential use traffic lanes from these provisions.

(3) Require the Department of Motor Vehicles to include a summary of these provisions on each motor vehicle registration renewal notice, if space is available, without using an additional insert or incurring additional printing or postage costs.

The complete text of the bill is located at:

[http://www.sen.ca.gov/htbin/ca-billpage/AB/2282/gopher_root2:\[bill.curren.ab.from2200.ab2282\]](http://www.sen.ca.gov/htbin/ca-billpage/AB/2282/gopher_root2:[bill.curren.ab.from2200.ab2282])

Example Listing

EV Charging Station

—San Dimas, CA

Southern California Edison
Covina Service Center
800 West Cienega Avenue
San Dimas, CA 91773
Phone:(818) 302 1212

Charging Station Technical Info:

Outlets/Access/Manufacturer/
Model/Voltage/Amperage/Power

Quality:

8 Private NEMA 14 50 Receptacles,
240V/40A

Editorial

continued from page 3

cient by legislating testing and inspections will probably work about as well.

Not an Unbiased Source

Citing the University of California's Institute of Transportation Studies researcher who claims that replacing all gas-burners with EVs would only reduce CO₂ emissions by 20% is rather akin to the NET's parroting of Lesser Lave. ITS is not an unbiased source. Its purpose is to discover how to fit more gas cars on the streets, not how to build more efficient vehicles or prevent greenhouse warming. ITS gets much of its funding through or from the auto industry, who doesn't want to build EVs. A far better source would have been the Union of Concerned Scientists, a group CU respects and has often cited in the past.

CU's claim that hoped for EV innovations have not materialized is inaccurate and their descriptions of advanced EVs as two-seater pip-squeaks that can barely make 100 miles is outdated. Replacing an conversion EV's battery pack does not cost \$2000, and with proper treatment, lead-acid batteries can and do last for more than 1-2 years.

The CU writer's statement that getting stuck in traffic will lead to a decline in an EVs performance only reveals the author's unfamiliarity with their subject. Since most EVs don't idle, they do not use power when stopped. If driven with a little savvy, the slow pace of traffic movement and even the stop and go can be turned to advantage, resulting in more range, not less.

Drivers at Fault, not EV?

CU's experience with the Solectria Force does not ring true. I've driven those cars and have been more than satisfied with acceleration and performance. Is it possible that CUs test drivers did not know that the Force has several power settings, economy, normal and high-performance? If a driver always had the car in the economy setting, it wouldn't be the road rocket they might have been expecting. Or, if they used the

EV Carpool Lane Demo?

If a bunch of freeway-capable EVs got together and did a fast freeway run in the diamond lane, such a demonstration would discredit the hoary old claim that EVs would slow traffic. We know there are EVs that can run right over the gas cars. Let's put them out there and debunk this misinformation once and for all.

An EV flotilla with a couple of GM EV1s and Toyota RAV4s would be a good media EVent (Flanked by various Porsche Spyders, 914 roadsters, Saturns, Solectria Forces, Fiat X1-9s, Fiat 850s, Jet Escorts, S-10 trucks, Bradleys and even a road-legal SnoWhite (in front of course). All the EVs that finished the recent SFBEAR Three-Bridge-Rally would be candidates.

Not Just California

This could be done in Sacramento, the Bay Area and Southern California. It could also be done in other states that might have similar legislation pending, or to urge their lawmakers to introduce similar measures. Other state actions could also demonstrate support for California's EV community.

OK, you EV activists (as if you didn't have enough to do already), organize it!
—CB

high performance setting, they could damage their range.

Where did they get their sample car? Some Forces in fleet service have been abused, not maintained, or not driven just because the fleet manager wasn't really all that committed to the EV. If they borrowed one from a fleet, there was a good chance that it hadn't been completely charged or the batteries were "lazy" due to lack of use.

The description of the car's agonizing crawl indicates to me that something was seriously wrong and that it should have been fixed before the evaluation continued..

Did CU's drivers receive any instruction on driving an EV or did they just jump in and assume that the usual no-brainer mode of just steering the car and stomping on the pedals would suffice?

EVs challenge and utilize the human ability to think. By using some smarts, you can enhance an EVs performance far more than you can that of a gas car. Ask the American public to think? Horrors! But maybe mental effort is not such an anathema to the citizens of our country. I mean, they do buy computers. —EV

Click and Plug Charging

The easy-to-use maps connect EV drivers to recharging sites at the click of a button

Point your web browser to <http://www.calstart.org/services/stateindex.html> to start your search, or simply log onto the site and choose "Vehicle Services".



New Optimas Improve ACP Honda Range

On 8/28/96, an AC Propulsion EV went 145 miles on one charge, using new Optima spiral-wound lead-acid batteries. Representatives from Southern California Edison witnessed the test, which set a new performance benchmark for lead-acid-powered EVs, at their SCE Pomona course. The previous course record was set by the sodium-sulphur powered Ford Ecostar at 120 miles. AC Propulsion had set the previous best result for lead-acid powered EVs, 118 miles on earlier versions of the Optimas. The best for other lead-acid powered vehicles was 85 miles.

The demonstrated 145 mile range exceeds the less than 130 mi. ranges claimed by Honda and Toyota for their nickel-metal hydride powered EVs. The 4-passenger AC Propulsion EV used a set of Optimas that had been installed 7,500 miles ago.

AC Propulsion President Al Cocconi, who drove the car for the test, attributed the 23% range increase to battery improvements by Optima. "We used our demo car that has 47,000 miles on it, and didn't change anything for this test", said Cocconi, "After we installed these batteries in April, we began to realize they had significantly more capacity than Optima's previous generation EV battery. We are getting over 100 miles at 65-70 mph and that's without any special attention to efficient driving technique. We wanted an independent test for verification and that's what we got today."

Southern California Edison's Pomona Loop is a route designed by SCE to represent typical driving on suburban streets. Run at the posted speed limits, this loop requires a faster, somewhat more aggressive driving pattern than the US Federal Urban Driving Schedule, which is used to determine urban fuel

economy ratings for conventional cars. The AC Propulsion EV with 2 passengers on board completed 7.5 laps of the 19.4 mile route for 145 miles with an average energy use of 126 Wh/mile.

The Optima EV battery is similar to the starter battery that Optima already produces at its Colorado factory for after-market and racing applications. It uses the same sealed, spiral-wound construction, but requires specific formulations for the electrolyte and electrode materials.

"These internal design changes are where Optima has really been making progress" said Cocconi. "The range and battery life just keep getting better, but the important factor for me, as the EV constructor, is that these batteries are presently available in initial production runs at a price I can afford and have demonstrated 30,000 mile life in actual daily use. Some advanced batteries promise even greater range, but with them, actual price and availability are unknown."

The AC Propulsion EV uses the AC-150 electric drive system, a 150 kilowatt (200 horsepower) electric powertrain for vehicles in the 2500-4000 pound weight range.

It embodies advanced motor control, battery recharging, and driver interface control logic and circuitry to provide high performance, high efficiency, recharging, and battery management functions in an integrated package. The AC-150 is manufactured in California by AC Propulsion, Inc.

AC Propulsion

Alan Cocconi, Research & Design Engineer, Phone: 909-592-5399, FAX: 909-394-4598. Address: 462 Borrego Court, Unit B, San Dimas, CA 91773 USA

Vehicle and Battery Specifications

Curb Weight: 3200 lb

Passengers: 4

Power Plant: 200 hp AC induction motor, direct drive

Battery Type: 28 Optima deep cycle 50 Ah, 12 V modules

Battery Weight: 1,230 lb

Chassis Type: Modified 1994 Honda Civic

0 to 60 mph accel.: 6.2 seconds

Top Speed: 85 mph (electronically governed)

Range @ 65-70 mph: 100 miles

Charger Type: Integrated with drive system, 20 kW

Recharge Time: 1 hour for full charge

DESCRIPTION: AC Propulsion produces high-power, high-efficiency electric drive systems, electric vehicle instrumentation systems and complete vehicle conversions.

EV Resources

Chip Gribben reports on 8/16/96 that his "EV Information Network" web site is now up at <http://www.radix.net/~futurev>.

It has "...EV Facts, EV Showroom, Resources, Batteries, Building a Conversion, and links to many great sites on the web. Comments welcome." Chip Gribben <futurev@RADIX.NET>

Chip also says that he caught a glimpse of GM's commercial for the EV1 that was shown on CBS at about 10:58 PM on Tues during the Democratic National Convention. Though he was half-asleep, the red EV1 got his notice, as did the message on the trailer-mounted warning sign that said something like "Power to the Public". (Has anyone got a tape of the commercial, or a script? CE would like to see it.—CB)

Surplus Traders Company has a website with a section for surplus electric vehicle parts at <http://www.73.com/a/0225.shtml>. They also have 80 Sinclair C-5 electrics in stock for \$850 each. Info from Bob Jackson

From: Bob Jackson <bobj@BOI.HP.COM> (8/19/96)

Bob Jackson also writes:

The Robert Q. Riley Homepage (<http://www.netzone.com/~rqriley/>) keeps getting better. They've now got about a half a dozen short papers w/ pictures and diagrams on subjects like:

How to Develop, Protect, and Market New Product Ideas: Explains how to create intellectual property, the costs of obtaining a patent, and how to develop and market a new invention. A must-read for inventors and entrepreneurs.

One-Off Construction Using Fiberglass Over Urethane Foam: This is a system for making custom-designed fiberglass automobile bodies, boats, and many other products without having to

Corporations Sponsor Conventions, Lobby Congress

A number of companies contributed \$100,000 or more to the Democratic or Republican National Conventions. What were they hoping to buy? Well, here are some of the issues they've lobbied Congress about, courtesy of the Associated Press:

—AT&T, provides telecommunications: Overhaul of telecommunications regulation, research and development tax credit, Clean Air Act.

—Browning-Ferris Industries, waste disposal company: Superfund environmental cleanup.

—Chrysler Corp., automaker: Clean Air Act, Clean Water Act, electric vehicles, truck and auto fuel efficiency standards, trade with China.

—Philip Morris Companies, cigarette maker whose divisions include Kraft Foods and Miller Brewing Co.: Food and Drug Administration reform, regulatory reform, meat inspection, antitrust law.

—Tenneco Inc., manufactures auto parts and packaging, plans to spin off its ship and submarine building division: Defense Department spending, Superfund environmental cleanup.

Some corporate sponsors' names have not been made public.

Associated Press, Tel# 415-621-7432 Fax:415-552-9430

1390 Market, Suite 318 Fox Plaza, SF, CA 94012 USA

Contact: Steve Elliot for Email Web access for AP.

From: "Bruce D. Parmenter" <BruceDP@WORLDNET.ATT.NET> [POSTED on the Internet]
Alternative Energy List and Electric Vehicle List Newz. For Public AE & EV informational purposes.

build a mold. Explains step-by-step how to do it. Heavily illustrated with photos.

Automobile Ride, Handling, and Suspension Design: Provides an overview of automobile suspension systems and the attributes that determine vehicle ride and handling.

Three-Wheelers in Automotive Application: Explains three-wheel handling dynamics and the differences between single front wheel and single rear wheel platforms.

Electric and Hybrid Vehicles: The Benefits, Challenges, and Technologies. An overview of EV emissions and energy savings, as well as the technologies

and design practices of battery-electric and hybrid-electric cars.

Transportation's Impact on Energy and the Environment: This is an in-depth study of the world's energy and environmental problems, which reviews possible alternative energy and transportation options."

From: Bob Jackson <bobj@BOI.HP.COM> 8/15/96

Phoenix EAA member Lanette Racine reports that AeroVironment, Inc. will be on-line soon at <http://aerovironment.com>. AeroVironment is the outfit who really designed GM's EV1. Lanette Y. Racine <evchdlr@PRIMENET.COM> (8/15/96)

Electric Lite

BY JON MAUNEY

As I sit around waiting for the perfect donor car to drop in my lap, I plan out the important details of the future conversion, such as what color to make the battery boxes, whether I can find a Reddy Kilowatt "All Electric" badge to put on the rear, and what noises the car should make. For example, what should happen if the former ignition switch is turned all the way to the start position. I was thinking of wiring in a buzzer, to alert any cats that are sleeping under the car that it's time to move.

Similarly, when the car is backing up, instead of an annoying beep, how about having the onboard computer play a digitized recording of the friendly putt-putt of a Model A, through a small speaker in the general vicinity of the late unlamented tailpipe?

Maybe even a lever that pushes some playing cards (or a piece of stiff plastic) into the wheel spokes (or nearest equivalent) for use in the vicinity of pedestrians. Instead of honking the horn, just add a motion-related sound until they people look up and notice.

The silence of an EV is all very well, but the American love-affair with the automobile is all about personal expression, and what better form of expression than totally out-of-context sounds?.

Jon Mauney <mauney@JTEC.MAUNEY.COM> Raleigh NC.

Hey, why stop there? Maybe some stuff from cartoon soundtracks or various weird space sounds like the transporter from Star Trek. My EV and I are ready to beam up, Captain—CB

EV RESEARCH

EV Drivetrains Discussed in London

On 6/28/96, IEE hosted a colloquium on "Machines and drives for electric and hybrid vehicles."

The list of papers reads:

- 1) Brushless DC motors for electric and hybrid vehicles (R L Hodgkinson - Nelco).
- 2) Brushless motors for electric and hybrid vehicles (G Henneberger - Uni Aachen)
- 3) Operational experience of a hub mounted electric drive train for a high performance all electric vehicle (Mellor, Allen, Howe - Uni Sheffield)
- 4) Brushless permanent magnet drives for hybrid electric vehicles (Schofield- Mag Sys Tech)
- 5) Performance characteristics of PM and Reluctance machines to meet EV requirements (Chalmers, Musaba - UMIST)
- 6) High performance switched reluctance drives using novel windings (Mecrow, Clothier, Barrass - Uni Newcastle Upon Tyne)
- 7) Hybrid Electric Machines (Corbett, Mellors - Uni Warwick/Rover Group)
- 8) High speed axial flux disc generator - unlocking the potential of the automotive gas turbine (Pullen, Etemad, Fenocchi - Imp Coll Science Tech & Medicine)

Contact IEE, Savoy Place, London, WC2R 0BL for copies. they may be available at local libraries or online.

Source: Ciaran Patterson <cjp@ELECMA3.UCD.IE> (8/16/96)

Batteries—OPTIMA Group Buy, SF Area

BY BRUCE PARMENTER

Don Gillis of the EAA San Jose Chapter is arranging a group purchase of OPTIMA EV batteries for persons in the SF Bay Area (Don is in the South Bay).

If you are ready to purchase EV batteries, contact Don Gillis at (408) 225-5446 or (don.gillis@pctie.microbbs.us.com) on a price at your quantity. There might be an OPTIMA in your future! —BP

BruceDP@aol.com

Genesis Website

Hawker Energy Products, maker of Genesis batteries, has a web site at: www.hepi.com

They have downloadable spec sheets and catalogs in PDF format, and an FAQ section which answers questions about: like:

- ☐ orientation of mounting
- ☐ cold weather performance
- ☐ charging

Source: EVDL post on 8/2796 by Eric Adams <eadams@CLDX.COM>

WHY SHOULD YOU BUY FROM ELECTRO AUTOMOTIVE? IN ONE WORD, EXPERTISE.



Sure, we also have the finest quality conversion components and kits. But to be honest, some of our competitors sell some of the same parts. What can we offer you that they can't? Unmatched electric vehicle expertise.

* **AUTOMOTIVE EXPERTISE.** Components in a car experience stresses not found in stationary electronics applications. We understand those stresses like nobody else in the business. We've spent 28 years under the hood. Professionally, not as a self-taught hobby.

* **ELECTRIC VEHICLE EXPERTISE.** We've been in the business of converting cars and helping people convert cars longer than anyone else—since 1979. We've seen it all. In fact, we wrote the book. Our step-by-step how-to manual **CONVERT IT** is the industry standard, supplied by utilities and the Department of Energy to high school conversion projects across the country. (\$30.00 postpaid in the U.S. and Canada, \$35.00 elsewhere. U.S. dollars only, please.)

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POB 1113-EAA
FELTON, CA 95018
(Outside U.S. & Canada, add \$5.00.)

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- Curtis DC/DC Converters
- Lester & K&W Chargers
- Trojan Batteries
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The Best Service

- EV Calculations
- Installation Book
- Wiring Schematics
- Video Rental
- Tool Rental
- Mastercard/Visa/Discover



When you need components and service call EVA.

We are the first choice!

Electric Vehicles of America, Inc.

48 Acton Street PO Box 59 Maynard, MA 01754-0059
(508) 897-9393 Fax (508) 897-6740

Committed to Quality and Safety

Chevy S10
conversion
by EVA

Bank of America Employees Join Station Car Demo

BY MARTY BERNARD

August 13, 1996, Berkeley, Calif.) This afternoon, five Bank of America employees were trained to participate in the San Francisco Bay Area Station Car Demonstration. At the completion of the training they each drove a battery-powered station car home. Each workday they will drive it from home to the Bay Area Rapid Transit District's Ashby Station, park it in specially designated spaces, plug it in to be charged if necessary, ride the train to work, and upon returning in the evening, drive it home. They will have use of the vehicle for local trips evenings and weekends.

Bank of America is the second employer to sponsor employee participation in the demonstration. Sybase, a software firm, was the first. Sybase employees for the last nine months have been using station cars between the Ashby Station and their work site and for errands during the workday.

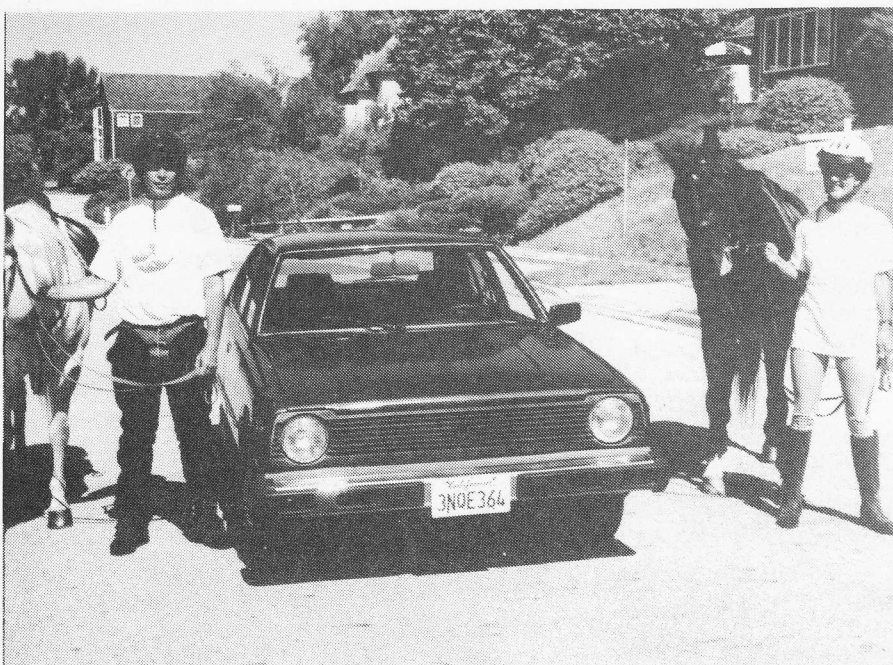
By this fall 40 station cars will be in demonstration at four stations in the Bay Area.

For more information on the station car concept, the Bay Area, Miami, or Atlanta demonstrations, pictures of station cars, and related information, the National Station Car Association invites you to visit its Web Info Pages at <http://www.stncar.com>. If you want to learn about the French concept of station cars, visit <http://www-rocq.inria.fr/praxitele>. — MB

Access: Marty Bernard <stncar@ix.netcom.com> 8/14/96



B of A and Sybase employees are using PIVCO Citi-Bee station cars.



Non-polluting transport: Richard Rahders' Datsun 510 Electric meets neighbor ponies. Photo credit: Richard Rahders

“Web It Out!” Bruce (EVangel) Parmenter

EAA Chapter Websites

Phoenix, AZ

<http://www.primenet.com/~evc>
hdlr. Check out their EV Photo Album!

Sacramento, CA

<http://www.calweb.com/~tonyc/eaa.html>.
Back issues of Current Events available at this site.

San Jose, CA

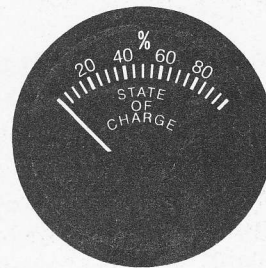
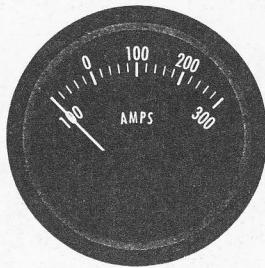
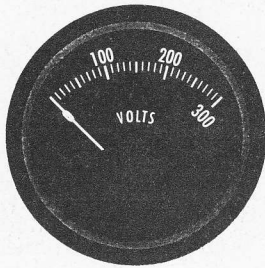
<http://members.aol.com/sjeaa/index.html>

Silicon Valley, CA

<http://pwp.usa.pipeline.com/~beckettw/sveaa.html>

(more to come)

Electric Vehicle Instruments



Analog Instruments to Monitor

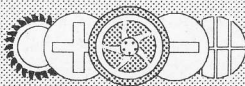
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Desert Lightning Information: <http://www.primenet.com/~ecoelec/convnew.html>

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One Day in the Life of an EV Battery

BY STAN SKOKAN

Last year I wrote about the two hour on-board charging capability of my 1983 Grumman aluminum-body postal van. (See Current EVents, October 1995) This year I repeated the performance, logging 153.7 miles on a similar route at the August 10, 1996 East Bay Rally. One day before the rally, I installed a small data acquisition system, which recorded the battery performance data in the charts that accompany this article.

(I recorded other parameters that day, such as temperature, battery and motor currents, but their presentation here today would make this article too long.)

First, some short background for those who missed last year's story:

BART's 480V Contribution

The August 10 rally is organized by the East Bay Chapter of EAA in cooperation with Bay Area Rapid Transit system. BART's involvement gives this EVent one unique flavor; BART provides 480V 3-phase power for charging during the rally, which runs from 10AM until 5PM. In addition to the miles driven during rally hours over flexible routes, participants from all over the Bay Area are encouraged to drive their cars to the rally and back home afterwards.

65 KW for Rally Cars

This year we had two 25 kW transformers mounted on a trailer plus my own 15 kW portable transformer on a dolly. Each transformer was connected between two AC phases to even-out the three phase load. Almost two dozen rally vehicles took advantage of this charging capability. Charging speed and, subsequently, miles driven during the day were a function of the individual vehicle's charging capability.

Stan's 12 KW Charger

The 1983 Grumman van I was driving had four 3 kW unity-power-factor chargers installed for total of 12 kW charging capability. With the size of my battery pack, this meant close to 100% charge in two hours. By this, I mean almost full charge, not 50% or 80% as is claimed by some other fast chargers. With the two other 25 kW transformers loaded with other cars we had a little more voltage drop on the long 480V cable so my primary voltage was only 440V. As a result the initial charger current was 110 Amps average, about 10 % lower than last year.

Figure 1 shows a whole day of 84V nominal lead acid battery voltage as recorded. The data recorder took samples of battery voltage every 10 seconds with a resolution of about 0.5 V. You can clearly see four discharge cycles and three full charging cycles plus one partial cycle. The discharge cycles range from 92V for a fully charged battery, down to 66V for an almost completely discharged battery. The charging cycles go from 84V at the beginning of charge up to 105V at finish charge.

As you can see, the voltage range could be easily 2 to 1 between the end-of-charge voltage and the almost-discharged voltage with the batteries under load. The waveform may seem noisy, but in reality the voltage does changes that rapidly. During discharge, voltage varies instantly in response to a current draw of 0 to 400A. During charging, the recorder alternately sampled the 200 A charging pulses which were delivered at a 120 Hz frequency of on-and-off periods.

Charging Shorter than Discharging!

Notice that the charging cycles are actually shorter than the discharge cycles. This proves that discharging the

battery during urban driving can take longer than recharging!

First Cycle

The chart starts at 6:35 AM with the end of the refresh charge cycle. Battery voltage drops exponentially to unloaded voltage. The first trip from Redwood City to Berkeley over the Bay Bridge started at 6:50. We arrived at Berkeley BART at 7:57 AM and started charging at 8:05, as indicated by the voltage rise. Shortly after 9:00, the two chargers were shut off. I wanted to finish this charging cycle slowly in order to cool off the battery. I had plenty of time before the 10 AM rally start.

At 10:20, the rally finally got under way and we headed for the Bay Bridge. We drove through San Francisco and over the Golden Gate Bridge to Sausalito. From Sausalito we went by San Quentin over the Richmond Bridge, returning to Berkeley BART at 1 PM.

Cycles 2-4

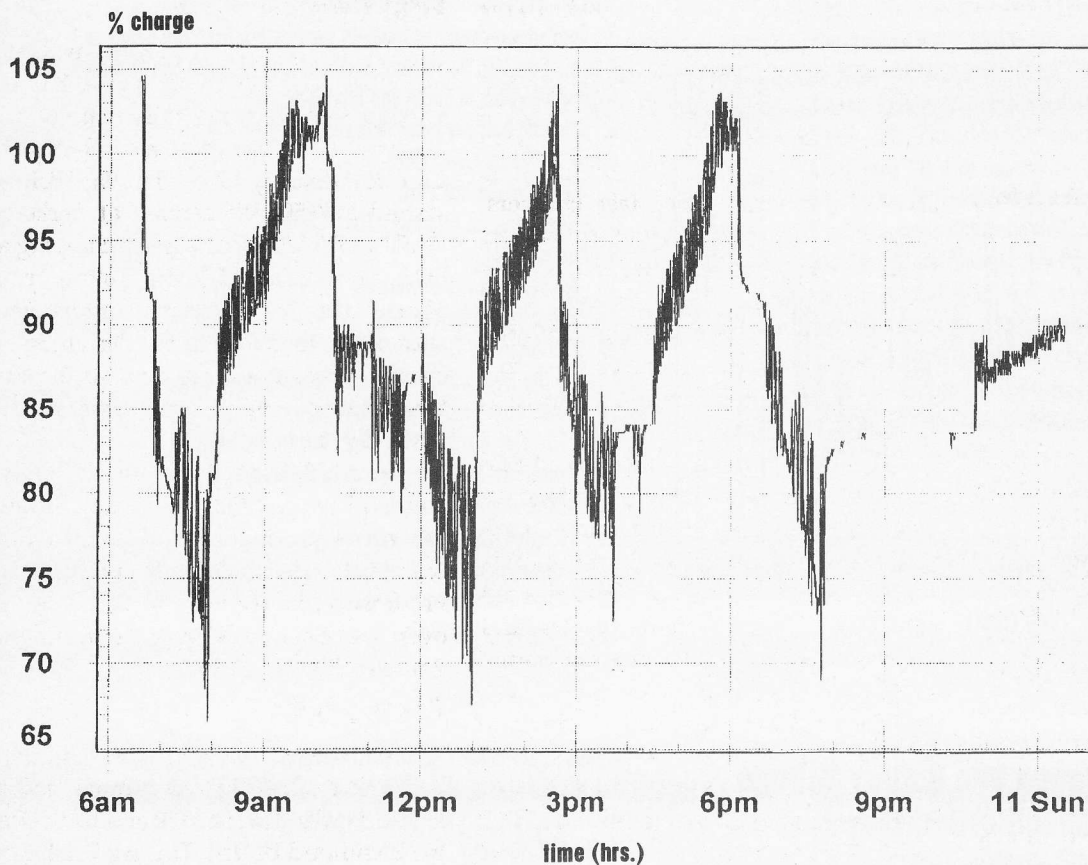
The second charging cycle took until 2:35 PM. At 2:40 we took a quick ride to San Rafael, and went back and forth over the Richmond Bridge. The third charging cycle started at 4:33 PM and finished at 6:10. At 6:30, after rolling up the 480V cable we headed back to Redwood City. We arrived at 7:50 PM after completing 153.7 miles according to the van's odometer. I let the battery cool off and started a slow overnight charge at 10:45 PM.

Don't Depend on Battery Voltage

The small steps and wiggles at around 8 PM show the battery voltage recovering exponentially (the steps are due to the 0.5 volt resolution steps of the recorder). By looking at this waveform you can appreciate how difficult it is to

continued on next page

Figure 1. 1983 Grumman Van Battery Voltage - 1996 East Bay Chapter EAA



build an accurate fuel gauge based on battery terminal voltage.

Score: One for Electrics, Zero for Gas

Those of you living in the Bay Area may remember that many parts of Northern California had an electricity blackout between 3PM and 7PM that day due to a big failure of the West Coast power distribution system in Oregon. Those at the rally may remember the heavy black smoke from Richmond Chevron Oil refinery. While the refinery lost power and had to burn unprocessed hydrocarbons, we continued charging electric cars without interruption.

Thanks to BART's high priority, its power was never disrupted. That's one for electric transportation zero for the gas refinery.

Lead-Acids and Lead Foot

Figures 2-5 show the details of each trip. The numbers along the charts refer to landmarks, so you can see the effects of varying driving conditions on battery voltage.

Those four different trips demonstrate various driving patterns of driving and battery behavior. The freeway runs are identified by continuous battery discharge while battery voltage recovers during rest periods. Notice the com-

pressed up and down variations during driving in congested city traffic. The voltage excursions at the beginning of discharge are shorter than the same or lower current variations at the end of discharge. The internal resistance of the lead/acid battery is lower at high state of charge and higher at low state of charge.

Observe the slow drop-off of battery voltage during the first half of the Three Bridge trip due to low speed and lengthy trip time. In contrast, the fast drop-off during the second half of the trip is due to the high-speed freeway run with nearly discharged batteries. The lower overall voltage drop during the first

20 miles is due to plenty of recovery time (I added the mileage information on top of the chart). The large over-all drop in voltage the second 23 miles is due to high rate of discharge and lower state of charge. (Do not try to compare the four runs against each other. There are different voltage and time scales, so the slopes may be deceiving.)

If you ever calculate the horsepower of your car by multiplying the reading of dashboard current by nominal battery voltage, you can easily be off by factor of three. As these charts indicate, you need to know the instantaneous voltage at any given moment. The available horsepower from your battery will be much lower

continued on page 14

One Day

continued from 13

**Figure 2. 1983 Grumman Van Battery Voltage
Redwood City to Berkeley**

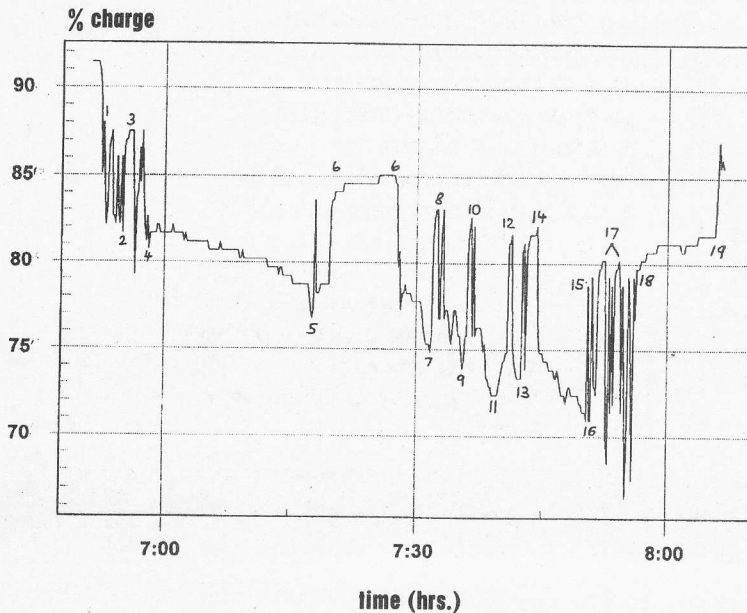


Fig.2: Redwood City to Berkeley.

38.4 miles, 12.26 KWH DC, .32 kWh/mile

- 1 to 2 - Woodside Road, downhill
- 3 - Coast-down across Middlefield intersection from rail overpass
- 4 to 6 - Fwy 101 North from Redwood City to South San Francisco
- 5 - Rail overpass in South San Francisco
- 6 - Rest and halfway point data readings
- 6 to 7 - 101 by Cow Palace
- 7 - Hill at Candlestick Park
- 8 - Intersection of Freeways 101 / 280
- 9 - Potrero Hill
- 10 - Coastdown to SF downtown
- 11 - Climb up the Bay Bridge
- 12 - Coastdown to Treasure Island
- 13 - Up the Treasure Island to cantilever bridge section
- 14 - Down from cantilever to Toll Plaza
- 14 to 16 - Fwy 80/880 from Toll Plaza to Berkeley
- 15 - Coastdown to University exit in Berkeley
- 16 - Rail overpass in Berkeley
- 15 - 18 uphill city streets in Berkeley
- 17 - Waits at signals
- 18 - 19 rest during charging set-up
- 19 - Charging cycle start

**Figure 3. 1983 Grumman Van Battery Voltage
Berkeley-Sausalito-Berkeley**

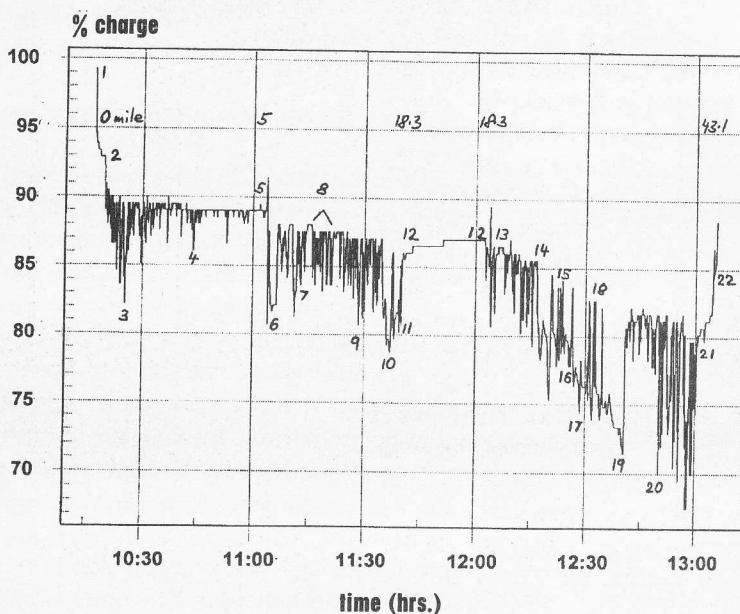


Figure 3: Berkeley - Sausalito - Berkeley

The three Big Bridges

43.1 miles, 14.15 KWH DC, 0.33 kWh/mile

- 1 - End of charging
- 2 - Start from Berkeley BART
- 2 to 3 - Berkeley city streets downhill to Fwy 880
- 3 to 4 - Slow bumper to bumper on 880
- 4 to 5 - Bay Bridge Toll Plaza crawl
- 6 - Bay Bridge up to Treasure Island
- 6 to 7 - Congested traffic on Bay Bridge
- 7 to 10 - San Francisco streets
- 8 - Wait at signals on Embarcadero
- 9 - Bay Street hill
- 10 - Doyle Drive thru Presidio
- 11 - Golden Gate Bridge
- 12 - 12 rest at Marina lookout, data collection
- 13 - Coastdown to Sausalito
- 13 - 14 Sausalito stop and go
- 14 - 15 Fwy 101 from Sausalito to Larkspur
- 16 - San Quentin
- 17 - Richmond Bridge climb-up
- 18 to 19 - Fwy 580 from RB Toll Plaza to Fwy 880
- 19 to 20 - Fwy 880 on-ramp (heavy traffic) crawl
- 20 to 21 - Uphill Berkeley city streets to BART
- 22 - Start of charging

**Figure 4. 1983 Grumman Van Battery Voltage
Berkeley-San Rafael-Berkeley**

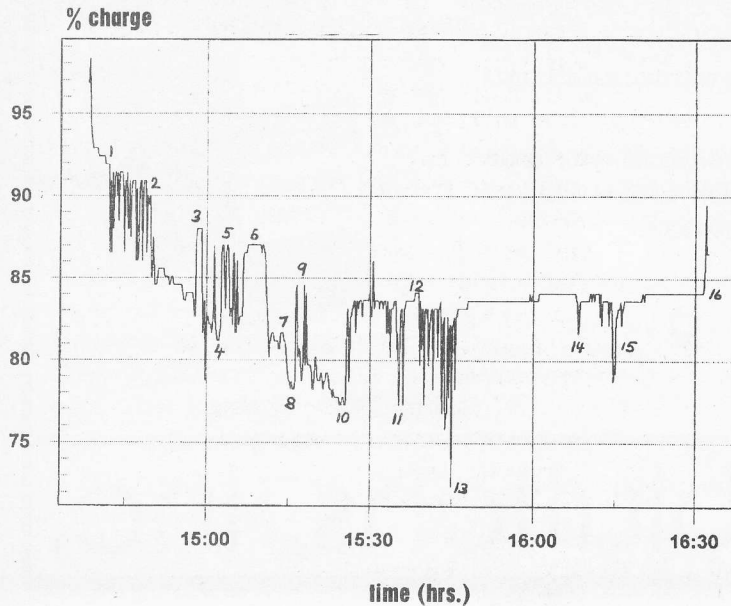


Figure 4: Berkeley - San Rafael - Berkeley via Richmond Bridge
40.8 miles, 10.18 KWH DC, 0.25 kWh/mile

- 1 to 2 - Downhill city streets to Fwy 880 at Gilman on-ramp
- 2 to 3 - Fwy 880 / 580 to Richmond Bridge
- 3 - Richmond Bridge Toll Plaza
- 3 to 4 - Richmond Bridge rollercoaster
- 5 to 6 - San Quentin to San Rafael Fwy 580
- 6 - Midway trip data collection
- 6 to 7 - San Rafael to San Quentin Fwy 580
- 8 - Climb up the Richmond Bridge
- 9 to 10 - RB Toll Plaza to Fwy 880
- 10 to 11 - Traffic jam crawl at Fwy 880 on-ramp
- 11 to 12 - Coast down to Gilman exit and signal wait
- 12 to 13 - Uphill on Berkeley city streets to BART station
- 13 to 14 - Wait in BART parking lot
- 14 to 15 - Rolling resistance test in BART parking lot
- 16 - Start of charging

**Figure 5. 1983 Grumman Van Battery Voltage
Berkeley to Redwood City**

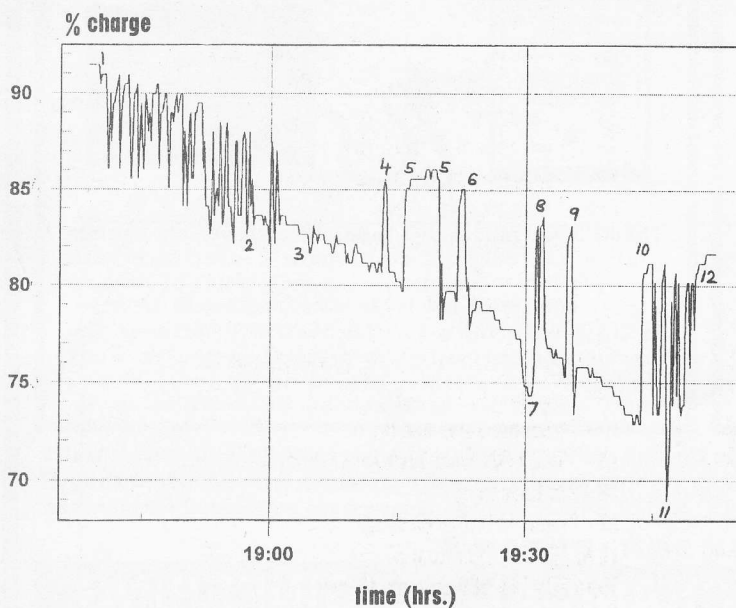


Figure 5: Berkeley to Redwood City via San Mateo Bridge
41.6 miles, 12.76 KWH DC, 0.31 kWh/mile

- 1 to 2 - Downhill Sacramento street from Berkeley to Oakland
- 2 to 3 - Fwy 590 from Fwy 24 to Fwy 880
- 3 to 4 - Fwy 880 South from Oakland to Hayward
- 4 - Fwy 880 to Fwy 92 interchange
- 5 - Rest and midway data collection on Fwy 92 in Hayward
- 6 - San Mateo Bridge Toll Plaza
- 6 to 8 - San Mateo Bridge
- 7 - Climb over the SM Bridge highrise
- 8 - Coast-down from highrise
- 9 - Fwy 92 to Fwy 101 interchange
- 9 - 10 Fwy 101 south from San Mateo to Redwood City
- 10 - Signal at Veterans Blvd. on Woodside Rd. (Hwy 84)
- 10 - 12 Woodside Road uphill
- 11 - Rail and El Camino overpass
- 12 - Stan's house - end of trip

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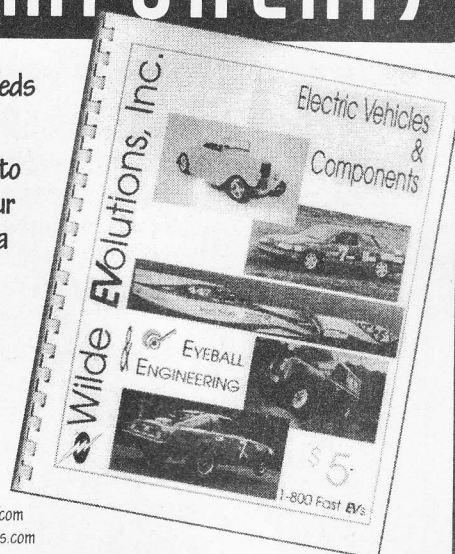
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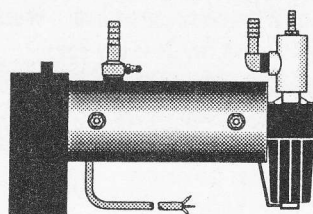
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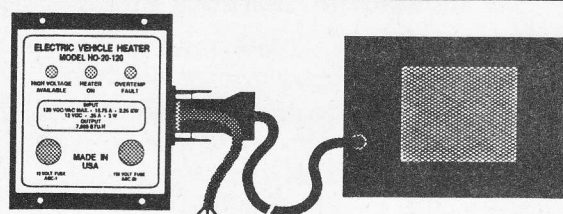
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The RUSSCO Models HO Safety Electric Vehicle Heaters replace the original equipment heater core with an airflow resistance assembly, providing highly efficient heating. An Electronic Control Module with built-in diagnostics interfaces the traction batteries to the resistance heater. Four models are available, providing up to 1500 and 2000 watts in systems of 96 to 336 volts.

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Letters to the Editor

(This one is so delightful I wanted to share it with readers—CB)

Monday in the GULF off *sunny shores—whew!* of Bahrain, 29 July '96
Clare, Anna, June, As'Salam'alaikoom *and All y'all **

Definitely into cooling my heels, (tho "cooking" thru warm and muggy to nth degree seems more in line. Inshallah *** the A/C holds...) while seeing WHY the \$23,000,000,000 is spent on national security (and oil from) for the Persian Gulf.. as well a being a contracted college instructor teaching American History and US Government to sailors and marines aboard USS Tarawa (see enclosed postcard) However over to business now — TRIANGLE EAA for the greater Raleigh-Durham-Chapel Hill are is up and running, so can you support efforts to get word out by some editor's notes and a note in C of E.

Such assist should catch the attention of EAA members in Carolina and definitely prospective ones.

Thanks and MA'ASALAMA

O'Jerr-of-Arabia

Jerry Asher, Interim VP, Triangle EAA

PS 1. Hope to see you in Sept. at NESEA's EV/S expo and symposium in NYC
2. Any listing for EAA members (by zip code) in/around the TRIANGLE possible... while still at sea, so I can drop a postcard o'gram?

*Arabic Greeting **Dixie plural of "you-all" ***God Willing ****Adios

(Will do, Jerry. It should be in this issue. Sorry it missed September, (not your fault, my mail got delayed). Since you wanted to get word out ASAP, I'm also putting it on the Internet EV Discussion List. Don't know if I'm going to make it to SE/V in NYC. Glad to have Triangle aboard.—CB)

Triangle Electric Auto Association, an affiliated chapter with the National EAA (operating since 1967) is meeting at 3:00 PM on Tues, Sept. 24 at the Conference Room of the Industrial Electrotechnology Lab (IEL) of the Alternative Energy Corporation, situated in the School of Textile building on the Centennial Campus of NC State University. Triangle EAA serves as an electric vehicle forum, informational network for a wide array of interested parties. Open to general public without requirement of membership. Toll-free (800)537-2882 for membership. Other inquiries to Jerry at EVANC (919) 403-8137.

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News in Brief

News in Brief is compiled by Ruth M. Shipley from information supplied by Environmental Information Networks. If reprinted, please credit CE and Ruth Shipley.

EV America Tests EV1

EV America recently completed testing of the General Motors EV1, with impressive results. The EV1 is slated to begin leasing from Saturn showrooms in California and Arizona this fall. The test results show that the lead-acid battery-powered car achieved a range of 136 miles at a constant speed of 45 mph and 89 miles at 60 mph. The car had a range of 78 miles under simulated daily driving conditions, and was able to accelerate from zero to 50 mph in 6.3 seconds. These are the first test results of an original equipment manufacturer EV to be made available from EV America. For details, contact John Castagna, 202-508-5661.

(EV AMERICA RELEASE: 7/22)

Model Home Includes EV and Charger

Along with high performance windows, water saving plumbing, passive solar heating and photovoltaic roofing shingles, a model environmental home in Atlanta has a GM Impact in its garage, complete with charger. Constructed by Southface Energy Institute in partnership with the Department of Energy, the building is designed to showcase the most advanced systems for energy efficiency. "And it just made sense to include an electric car in our demonstration," said Dennis Creech, Southface executive director. "Electric vehicles are at the cutting edge of efficient transportation technologies, so this model fits perfectly in our home." Georgia Power Co. provided the car and 220v charger, which will recharge the batteries in about three hours.

(SCAT RELEASE: 7/25)

NY Governor Touts EVs, AFVs

New York governor George Pataki offered hope that job development and environmental protection can move forward together at the Alternative Transportation Technologies Symposium held in Rome, NY in June. During his speech, Pataki said \$100 million would be budgeted from the Clean Water, Clean Air bond to promote the use of alternative fuel vehicles (AFVs) and \$1 million for companies conducting research and development on advanced transportation in New York. Pataki also reaffirmed his support for New York's EV mandate, which will require that two percent of all new cars sold in the state be zero-emission vehicles. Representatives from AFV manufacturers, electric vehicle and alternative energy associations, and local utilities also spoke at the symposium.

(GLENN/EV NEWS: 7/96)

BAT Tests Zinc Air Battery

BAT International has completed testing of the first production zinc air battery cells in the US, which were rated at 400 amp-hours. The cells, manufactured by Kummerow, NA of Germany, were tested at BAT's facilities at Calstart in Burbank, CA. Kummerow's zinc air battery has a higher energy density than conventional lead-acid or more advanced NiMH batteries, at a cost projected to be lower than a sealed lead-acid battery. The positive test results have led BAT to order 600 production cells from Kummerow, expected to be delivered in December. BAT will use these batteries to develop an EV for field testing by early 1997, with a planned range of over 250 miles while using a long-life battery costing about \$150 per kilowatt-hour.

(BAT RELEASE: 7/30)

First Electric Rangers Sold to CA

The first of the new electric versions of Ford's Ranger model pickup trucks have been sold to the local government fleet in Santa Clara County, California. The Rangers are being converted by Michigan-based Transportation Design and Manufacturing, Inc. (TDM), which will initially modify 15 pickups. TDM's vice president for electric vehicle manufacturing said the conversion program is likely to be expanded soon. The electric Rangers are available for a price of \$39,900 and feature dual airbags and a regenerative braking system. Options include air conditioning and an electro-hydraulic power steering system, which can be added for an additional \$2,999. Contact Karen Holtschneider, 313-322-7998, or Bill George, 714-939-3695.

(21ST CENTURY FUELS: 8/96)

Electric Taxi Debuts

England-based Advanced Transport Group, headquartered at the University of Bristol, has developed a convenient and environmentally friendly option to everyday commuting by car. The ULTRA (Urban Light Transport) is a 24-hour personal taxi system that takes passengers to their destination on the quickest route using "active tracks" — railways and tramways — and a central computer. Frequent stations are located off a main railway line, which allows other ULTRAcabs to continue operating without interrupting travel. The vehicle generates power from an induction rail fixed in the guideway. ULTRA can reach speeds up to 50 mph on expressways and 25 mph on feeder roads, and can carry up to four passengers. Visit Advanced Transport Group at <http://www.fen.bris.ac.uk/aero/atg/ultra.html>.

(EIN STAFF: 8/6)

Tropica May Make a Comeback

The Tropica may soon be resurrected under the name Zebra. Renaissance Cars, Inc. (RCI), founded by Bob Beaumont, introduced the Tropica in 1992, but the company folded in 1995. But former RCI shareholder Don Bright believes there is still a future for the electric roadster if its sticker price continues to be below \$20,000. "This car is simply too good to die," he said. Bright and other former RCI shareholders have now formed Zebra Motors, Inc. to carry forward with the "Zebra Model Z." RCI's remaining assets, including the prototype cars, have been purchased by Zebra and moved to California. "One dealer actually claims to already have a waiting list of 70 people who want to buy the Zebra," said Bright. Contact Bright at 707-794-8105. (GLEAN/EV NEWS: 8/96)

Base Will Convert to EV Production

Sacramento County (CA) officials have proposed the construction of private business "incubators" at McClellan Air Force Base for EVs and small business enterprises. The three facilities have the capability of luring the alternative vehicle industry to the region and employing hundreds of people. The project may receive funds from the Department of Defense and contributions from private businesses during its initial stages, and later companies will generate sufficient revenue to operate independently. California-based Calstart expects to operate one of the incubators. According to Calstart president Michael Gage, several companies have expressed interest in developing alternative fuel vehicles at the site.

(SACRAMENTO BEE: 8/13)

Cleaner Power Plants, Cleaner Eys

Critics who claim that electric power plants will emit more pollution than EVs will remove usually overlook the fact that gasoline cars get dirtier over time, while electric power plants do not. Over the course of its working life, a gasoline car will emit twice as much NOX as a generating facility producing the power to charge a comparable EV. Further, the conventional gasoline-powered car will spew out 60 times more carbon monoxide, 30 times more volatile organic compounds, and twice the carbon dioxide emissions as the electric power plant. New power plant emission controls will reduce stationary source pollution even further. And Northeast utilities will be switching from coal and oil to natural gas, wind, geothermal and biomass. (TECHNOLOGY REVIEW: AUG./SEPT. '96)

Law Firm's EV Program Wins Award

Los Angeles-based Graham & James, one of the most prestigious law firms in California, recently won a "Good Earthkeeping Award" from the City of Los Angeles for its EV program. Beginning last July, employees used the firm's EV to commute to work for a week. The program has evolved to allow drivers to keep the car, a two-door coupe provided by BAT, Inc., for one month. More than 35 people have tested the EV, and the program has been very successful in its first year, according to BAT. One

employee lived 25 miles away and 1,500 feet above downtown Los Angeles, while another lived 28 miles away and had a steep 1,000-foot hillclimb. For more information, contact Bill Wason at BAT, 818-565-5555.

(BUSINESS WIRE: 8/16)

Nissan to Sell Electric Minivan in US

Japan's Nissan Motor Corporation has announced that it will design an electric-powered minivan to be marketed in the US in 1998, when EVs are introduced in California on a trial basis. California will require that 10 percent of all new vehicles sold in the state by 2003 be zero-emission vehicles. Nissan will reportedly lease a lithium battery-powered version of the vehicle in Japan in the spring of 1997. Nissan intends to pattern its minivan for US markets on an enlarged version of the Japanese model. The company hopes the vehicle's popularity will coincide with increased demand in California and elsewhere, despite its somewhat higher cost. (COMLINE: 7/26)

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Event Calendar

Welcome to the EAA Calendar. It lists events of direct or related interest to EV enthusiasts and alternative transportation businesses.

Copyright Phoenix Chapter Electric Auto Association. Produced by K. A. Watson on behalf of the Electric Auto Association. All Rights Reserved. The intent of this Calendar is to provide a comprehensive list of events that will help to increase awareness and participation in the ever growing interest and use of Electric Vehicles. Your support and input is greatly appreciated. Thank you.

Sept. 30-Oct. 3

NiCad 96, Sitges, Spain. Biennial Nickel-Cadmium Battery Conference, organized by the International Cadmium Association. Presentations and discussions of the latest developments in batteries, their applications, and recycling. Held at Hotel Gran Sitges-Barcelona, near Barcelona. Contact: International Cadmium Association, European Office, 42 Weymouth Street, London W1N 3LQ, United Kingdom; tel +44 171 499 8425; +44 171 486 4007.

Oct. 3-6

Ausstellung ExpoVEL, Mendrisio, Switzerland. Information acquired from German publication. Contact: InfoVEL, M. Piffaretti, tel. +41-91-646-0606, fax +41-91-646-0535.

Oct. 7-9

Renewable Energy, Asia Pacific '96 Contact: tel. 852-2574-9133, fax. 852-2574-1997, email: altdev@hk.super.net

Oct. 11

Transportation 2010, Dayton, Ohio. A regional day-long symposium sponsored by The Engineers Club of Dayton and the Global Electric Auto Association will include presentations by EV and HEV industry leaders and ride'n'drive. Contact The Engineers Club of Dayton, 110 E. Monument Avenue, Dayton, OH 45402; tel. 513-228-2148, fax 513-228-4794.

Oct. 13-16

EVS-13, Osaka, Japan. 13th biennial international electric vehicle symposium, including addresses by major figures in industry and government, panels, exhibits, ride'n'drives. Contact: EVS-13, c/o Inter Group Corp., 7-5-17 Akasaka, Minato-ku, Tokyo 107, Japan, tel. +81-3-5570-6176, fax +81-3-5570-6178 or EVS-13 Secretary, c/o Japan Electric Vehicle Association, 2-5-5, Toranomon, Minato-ku, Tokyo, 105 Japan, tel. +81-3-3503-3651, fax +81-3-3503-8493.

Oct. 17-20

Monte Carlo Rendez-Vouz in the Port of Monaco. Accepting 50 teams to participate in rally 30 km long. They want EV companies to show their products. More than 5000 visitors are expected. For more information, call tel. (377) 92 16 03 76 or fax (377) 93 15 03 13, or write to Editions and Promotions Internationales, 11 Blvd., Albert Ier MC 98000, Monaco. Deadline for registration was July 26, 1996. Email epi@monaco.mc

Oct. 27

World Solar Challenge, Australia. 1996 Darwin to Adelaide, World Solar Challenge. Contact: Energy Promotions (02) 9988-4255.

Oct. 31

Generalversammlung Asver Bern, Switzerland Contact: Asver, J. Temperli, tel. +41-21-312-9090, fax +41-21-20-1019.

Nov. 2-3

Coronado Electric Classic, San Diego, CA. Location: Jack Murphy Stadium featuring the High School Challenge Series. Contact Electric Vehicle Technology Competitions, Ltd. (EVTC) in Phoenix, Arizona at tel. (602) 256-2599, fax (602) 256-2606.

Nov. 4-5

World Electric and Solar Vehicle Conference, Australia. The World Electric and Solar Vehicle Conference

will be held at the Adelaide Festival Centre. Contact: Myriad Conference Management, tel. (08) 387-3877, fax. (08) 322-6290, myriad@adelaide.dialix.oz.au

Nov. 23

Jahresschlussfest ECS, Switzerland. Information acquired from German publication. Contact: ECS, E. Stolz, tel. +41-1-826-0313, fax +41-1-826-0330.

Dec. 2-5

2nd SAE Global Vehicle Development Conference, Detroit, Michigan. Symposium featuring 70 presentations from industry leaders on global automotive topics including vehicle development, sourcing and regulatory issues. Held at the Westin Hotel, Detroit — Under the sponsorship of the Society of Automotive Engineers. Contact: SAE Promotions, tel. 412-772-7131, email: meetings@sae.org

Dec. 7-8

Desert Electric Classic, Tucson, Arizona. Location: Davis Monthan Air Force Base featuring the High School Challenge Series. Contact Electric Vehicle Technology Competitions, Ltd. (EVTC) in Phoenix, Arizona at tel. (602) 256-2599, fax (602) 256-2606.

Dec. 11-13

1996 North American EV & Infrastructure Conference, San Diego, CA Symposium, exhibition, ride'n-drive, held at the Sheraton San Diego Hotel & Marina. Sponsored by the Electric Vehicle Association of the Americas. Contact: EVAA, 601 California St. Suite. 502, San Francisco, CA 94108, tel. 415-249-2690, fax 415-249-2699.

1996 National EAA Election

EAA Candidate Bill Wedmore (nominated by Phoenix Chapter)

William (Bill) R. Wedmore, Age 67, born Muncie Indiana, 1928. Resident of Scottsdale, AZ since 1984. Married, wife Rita for 42 yrs, 3 children, 4 grandchildren. My oldest daughter, Leslie, is an EE working for IBM in San Jose.

Retired Electrical engineer. Worked for GTE Communications and its precursors for 34 years, most of that in R&D, designing Telephone Central Office Equipment. I hold 16 patents for industry related inventions. Retired in 1987. I currently do some consulting on Computer Applications.

Organizations:

EAA, Senior member of the IEEE, Mensa, FORTH interest group.

Hobbies/interests:

Ham Radio, Competition Bridge, Casino Poker, Golf, Handyman projects.

I expect to be an EV-1 owner/lessor as soon as they are available. I have already stubbed charger power into my garage in anticipation.

My views on EAA:

I see EAA growing exponentially throughout the next decade. As electric vehicles reach the mass market, we need to create an environment and presence wherein membership in EAA is a given for all owners. We need to be perceived as the consumer advocate of the industry. Big Auto is well aware that electric vehicles cost half as much to make and last twice as long as equivalent ICE units. They will not come willingly into this market without public and competitive pressure to do so. EAA's most important role for the present is to educate the public on the efficiency and practicality of electric transport.

There is a great deal of mis information and disinformation being distributed by oil and ICE interests. We need to be a force in publically correcting these misconceptions.

—Bill Wedmore

1996 EAA Election Proxy

I hereby assign my proxy to the present Board of Directors. Please sign and print your name, print the date, and note to which chapter you are affiliated.

SIGN NAME

DATE

PRINT NAME

CHAPTER AFFILIATION

The following Board members' terms expire this year, and they are running for re-election. Please choose four candidates. A name with an unmarked box will be treated as a vote AGAINST that person's election or re-election.

Re-elect

New Candidates

	For
Tony Cygan	☐
Ken Koch	☐
Steve Lough	☐

	For
Tim Loree	☐
Bill Wedmore	☐

(Write-ins)

_____	☐
_____	☐
_____	☐

■ Proxies are due by December 15, 1996

■ Send sealed proxies to: 1996 EAA Election, C/O Ana Cornell, 60

EV Want Ads

Tropica for Sale: One of only sixteen ever built, this sleek, white sportster, owned by a legendary automotive executive, creates a sensation wherever it appears and may have collectable value.



Fully equipped with digital instruments, AM/FM cassette and electrically activated trunk. Show-room-maintained with fewer than 50 road miles, this Tropica has never been titled. Qualifies for 10% federal and state EV tax credits. Costing more than \$300K to build, this one could be yours for \$27,500. Contact Dave Goldstein, (301) 869-4954. (Gaithersburg, Maryland)

For Sale: '81 Renault Le Car. 72 volt system, Curtis PMC controller, tow bar, range 30-50 miles, top speed 60 mph, 7,000 miles, \$4000. Call (541) 899-1127. (Jacksonville, Oregon)

For Sale: Total 96V EV Package. FB1-4001A 9" Advanced DC, Curtis PMC 1221 B Controller and Potbox Control, Sevcon DC-DC converter, K&W on-board charger and instrument gauges, Curtis Fuel Ga, GE main breaker, Allbright Main Contactor plus more \$2350. Contact Clayde Unger (715) 696-3374 (evngs.) (Florence, Wisconsin)

For Sale: Electrathon motors and controllers. More wins than any other motor. Also ideal for motorscooters, and lighter go-cars. 24-volt, 1 Hp continuous, 3 Hp peak. \$265 each. Call, Fax or write for fact sheet. 624 S. Archer St. Anaheim, CA 92804. (714) 956-3016.

For Sale: Cushman "Meter Maid" 3-wheeler, Tops 40 mph, 30-mile range, good acceleration. 72 volts, Trovan 5SHPs, Advanced DC k-91 Motor, Curtis Controller, Sevcon DC/DC, K&W charger, \$5900/obo. Call (714) 956-3016. (Anaheim CA)

Member Want Ads

Print clearly or submit typed copy of your ad with your name, address, and phone number. The EAA is not responsible for the accuracy of ads. Want ads must be received before the 1st of each month and must include payment to run in the next issue of CE.

\$10 for the first 35 words. Each additional word, 25 cents. Want Ads are available to EAA members for the sale of electric vehicles, equipment and parts only. If you want to run your ad in more than one issue, please specify and include payment for each issue requested.

For corrections or updates, please send a written note or fax to EAA Want Ads @ 408.374.8750. Photographs of your vehicles may be submitted with your ad. If room is available, we run one photo each issue. These photos will not be returned.

Send your Member Want Ad request and check made payable to: EAA Want Ads, 18297 Baylor Avenue, Saratoga, CA 95070

ADVERTISING RATES

Full page 7.25" x 9.25"

1 ad	\$400 ea
3 ads	\$300 ea
12 ads	\$250 ea

1/2 page 7.25" x 4.50"

1 ad	\$200 ea
3 ads	\$150 ea
12 ads	\$100 ea

1/4 page 3.50" x 4.50"

1 ad	\$150 ea
3 ads	\$100 ea
12 ads	\$75 ea

1/8 page 2.0" x 3.5"

1 ad	\$100 ea
3 ads	\$75 ea
12 ads	\$50 ea

Ads may be placed for 1, 3 or 12 months. Camera-ready copy for each ad must be submitted along with payment. Ads may be submitted on diskette in TIF or EPS format on the PC or MAC. For 12 ads, an invoice will be billed quarterly. A minimum of 3 ads need to be prepaid per quarter.

Ad Deadline

The Deadline for camera-ready copy is the **1st of the month**. Copy received after the 1st will be run in the next issue. Ads will be placed in the priority received. Prepaid ads will receive 1st priority.

Advertising Manager

Susan Hollis, Advertising Manager
Office: (408) 374-8605
FAX (408) 374-8750

Address

Make check payable to EAA. Camera-ready copy and payment for the ad should be sent to:

Electric Auto Association
18297 Baylor Avenue
Saratoga, CA 95070

CE ADVERTISERS

d B Associates	17
EcoElectric	11
EIN, Inc.	19
Electro Automotive	9
EV of America, Inc	9
KTA Services	24
Russco	16
Westberg Mfg. Inc.	11
Wide Evolutions, Inc.	16



100% Cotton Cap
Forest Green
'Charging into the
Future' EAA Logo
CAP001.....\$7.50



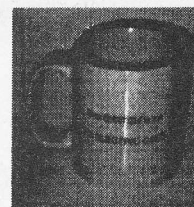
Auto SunShade
SS001.....\$8.00



T w/EAA Logo
(adult small only)
TS001.....\$14.50



Thermal Auto
Mug
MUG02....\$6.00



Porcelain Mug with
'Charging into....Future'
MUG003.....\$5.00



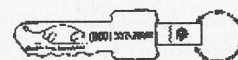
Window decal 'The Switch is on
to Electric Cars' Black and Red
printing. 3 x 9 inches
DC001.....\$3.00



Bumper sticker 3.75 x 15 inches
BS800.....\$2.50



Bumper sticker 3.75 x 15 inches
BS002.....\$2.50



EAA Key Chain, actual shape
may vary
KC001.....\$1.50

Printed materials

CE	Selected Current EVents (<i>specify specific issue</i>)	\$ 3.00 each issue
CEFY	Current EVents - Full year (<i>specify specific year</i>)	\$20.00 each year
PB001	Discovered:The Perfect EV Battery	\$ 2.00
FW001	Flywheel Energy Storage	\$ 5.00
BG1996	1996 Buyer's Guide to Electric Vehicles (Feb 96 issue CE)	\$ 5.00
BG1995	1995 Buyer's Guide to Electric Vehicles (Feb 95 issue CE)	\$ 5.00
TT001	Team Tucson Land Speed Record Plans	\$ 5.00
IDX001	EAA Current Events Index - 10 Years!	\$ 4.00
XA100	EAA XA-100 Hybrid	\$ 5.00

Other EV Items

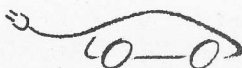
PN001	Ball point pen with "EAA, 800 phone # & Charging....Future"	\$ 1.00
CS001	Current Solutions/Motor Show Video Tape (14 minute runtime)	\$14.00
WL001	Window Literature Holder (fits pages 8.5 x 11 inch)	\$22.00
PARK01	"EV Parking Only" Sign (18"x12") green icon on white background	\$22.00

Electric Auto Association **Reprint** Order Form
Send order to: EAA Reprints
5820 Herma St., San Jose, CA 95123-3410

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Address _____
City, St, Zip _____

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Make check payable
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Total	

* for Canada add 15% or for other foreign destination add 25%

KTA SERVICES INC.

944 West 21st Street - Upland, CA 91784
Tel: (909) 949-7914 - FAX: (909) 949-7916

Established in 1984, KTA SERVICES caters to electric vehicle hobbyists and manufacturers by supplying EV components, kits, publications, and design/consulting services. We are a complete supplier of EV components and certified kits....everything you need except for the batteries. All components we sell have been selected with safety and reliability foremost in mind. All components are new, competitively-priced, and come with full manufacturer's warranties. We STOCK and sell the largest variety of the very best.

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- ◆ ALBRIGHT ENGINEERING Main & Reversing Contactors in 5 models
- ◆ BUSSMAN Safety Fuses in 3 models from 200 to 800 A
- ◆ GENERAL ELECTRIC & HEINEMANN Circuit Breakers
- ◆ SEVCON & CURTIS DC-DC Converters from 48 to 160 V input/14 V/25 A out
- ◆ BYCAN Battery Chargers for 48, 120-144 V battery systems
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- ◆ MAGNA Welding Cable Lugs in 3 sizes from #6 to #2/0
- ◆ Battery Cable Assembly Tools
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- ◆ DELTEC Meter Shunts in 4 models from 50 to 1000 A
- ◆ CRUISING Equipment E-Meters, Prescalers, & DC-DC's
- ◆ Electric Vehicle Heating & Air Conditioning Components
- ◆ 5 Conversions Kits for vehicles from 500 - 500 lbs. total wgt.
- ◆ 3 Conversions Kits for Go Karts — up to 90 MPH
- ◆ Complete ELECTRATHON Drive & Instrumentation Pkg.

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- Address Correction Requested ●

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