

WE WOULD LIKE TO GET ALL EXISTING EV'S INTO THE HANDS OF PEOPLE WHO WILL DRIVE THEM!!! SPECIAL ELECTRIC VEHICLE SALE ISSUE



FOR SALE: and many more see EV Marketplace!!

EVS-8 WASHINGTON, D.C. 10/20-23 1986

* Powerplex sodium/sulphur (NaS) had essentially the same exhibit at EXPO 86 Yet it was THE!! attention getter.

* Chloride reported at EVS8 that they plan to demonstrate a NaS-equipped EV "in early 1987."

* Ford described a one-third size "sub-battery" and said that in the future a full-sized will be fabricated and tested.

* Swiss firm Brown, Boveri et Cie (BBC) and the Canadian firm Magna International, a joint venture, have NaS batteries in production NOW!!

PTI (Powerplex) now has all the rights to the BBC developed NaS technology. BBC also developed the EV powertrain... a neat "drop in package which contains everything needed to convert a vehicle to electric. NOTE:(First introduced by Stan Skokan of EAA as the ELECTRIC ENGINE) 1982.

	<u>lead-acid</u>	<u>sodium/sulphur</u>
Range @ 56 km/h	81 km	209 km
Range on SAE J227	35 km	85 km
Accel. 0-50 km/h		
At full charge	16 sec	16 sec
At 80% DOD	58 sec	17.2 sec

* See Agreement Reached on Introducing U.S. Electric Van elsewhere in this issue.

* The real biggie was the "EV Man of the Year" award, which was presented to GTE's Cliff Hayden whose leadership in recent years has a lot to do with keeping EV development on track and in motion.

Con't on pg. 2

AGREEMENT REACHED ON INTRODUCING

U.S. ELECTRIC VAN

Palo Alto, October, 1986-

Representatives of the U.S. utility and auto industries have agreed to an approach to the introduction of a domestic electric van. An agreement was reached in Detroit at an EVDC meeting with the EPRI, GMC, and other firms participating in the project.

"THE GOAL IS TO EVALUATE THE FEASIBILITY OF PRODUCING AND MARKETING THE ELECTRIC VAN IN THIS COUNTRY,"

says EVDC Pres. Gerald Mader. "Following the successful completion of engineering and field evaluation of prototype vehicles, production and marketing could begin in 1988."

Con't on pg. 6

SANTA BARBARA INDUCTION

ROADWAY BUSES ALIVE & ?

* ROADWAY POWERED BUSES FOR MASS TRANSIT in Santa Barbara, CA were the subject of two EVS-8 papers (Roadway Powered Electric Vehicles=RPEV). This RPEV is a hybrid which runs on batteries which are recharged from the roadway. And power is not under all the roadway in the plan described for a 5½ mile route (so far, only 20 feet have been built). The power under the roadway is called Inductive Coupling System (ICS). Early in the day, the battery isn't discharged enough to accept a charge from ICS or regen. At these times, the energy

Con't on pg. 2

* IN THE DOE BATTERY PROGRAM (as reported on at EVS-8), the biggie seemed to be the fact that Nickel-Iron (NiFe) had gotten over 1,000 cycles. Still expensive and consumes a lot of water, must be cooled before charging.

Thanks to Ed Campbell (Alternate Energy Transportation Newsletter)

from ICS goes directly to the motor. Hence, this hybrid is an electric/electric hybrid. The ICS transfers energy from an inductor buried just below the surface of the street to an inductor mounted on the underside of the vehicle without any physical contact between the inductors.

Pulse-Width Proportional-Controller Circuit

A quad operational amplifier circuit yields full 0- to 100-percent pulse-width control.

Marshall Space Flight Center, Alabama

A proportional controller for motor speed provides full 0- to 100-percent linear control of the durations of motor-driving pulses. Conventional proportional controllers using phase-shift techniques provide a more-limited pulse-width range, typically 15 to 85 percent. As with any pulse-width proportional controller, the motor has high starting torque because the pulse height always equals the full supply voltage.

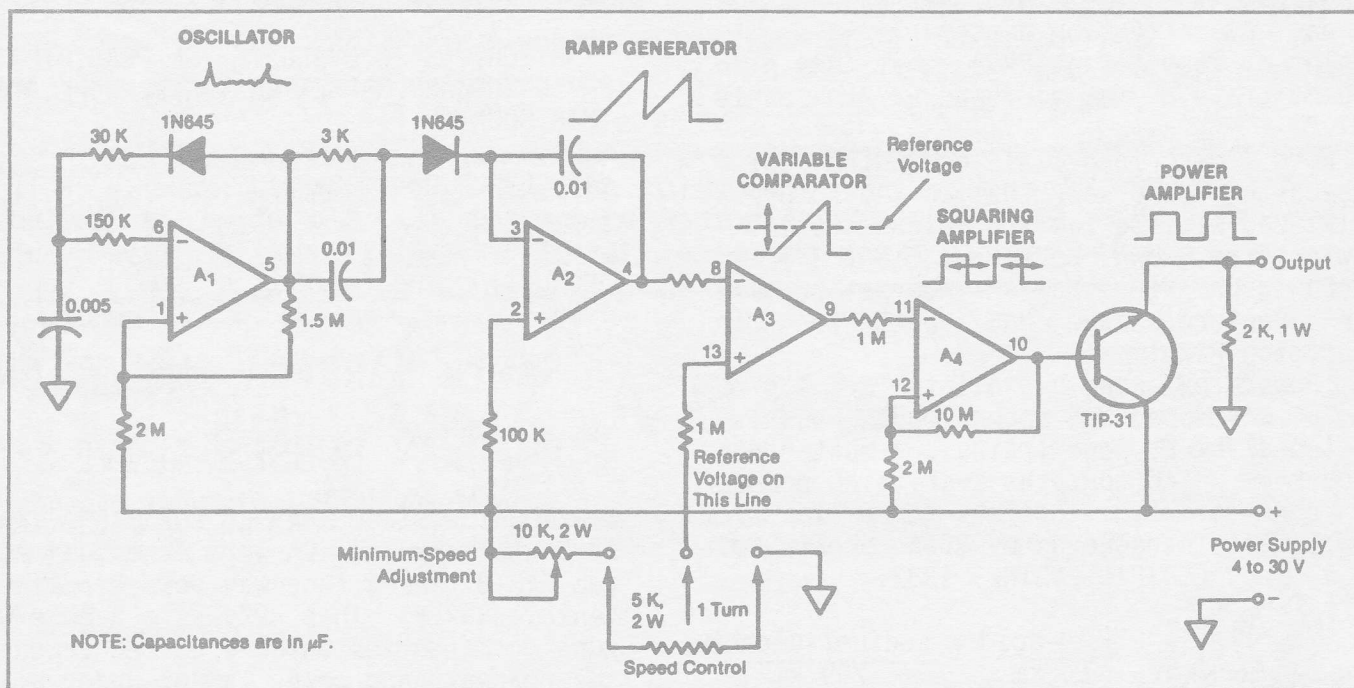
The controller (see figure) uses a commercially available LM3900 integrated circuit, which requires only a single supply voltage of 4 to 30 V. The pulse-

repetition rate is set by a 1-kHz oscillator that incorporates amplifier A₁. The oscillator feeds ramp generator A₂, which generates a linear ramp voltage for each oscillator pulse. The ramp signal feeds the inverting input of comparator A₃; the speed-control voltage feeds the noninverting input.

Thus, the output of the comparator is a 1-kHz pulse train, the pulse width of which changes linearly with the control voltage. The control voltage can be provided by an adjustable potentiometer (as shown) or by an external source of feedback information such as a motor-speed

sensing circuit. Depending on the control-voltage setting, the pulse duration can be set at any value from zero (for zero average dc voltage applied to the motor) to the full pulse-repetition period (for applied motor voltage equal to dc power-supply voltage).

An amplifier stage (A₄) with a gain of 10 acts as a pulse-squaring circuit. A TIP-31 medium-power transistor is driven by A₄ and serves as a separate power-amplifier stage. Additional power amplification may be required, depending on the motor being controlled. Since the power transistors that drive the motor are used essentially



The Proportional Controller is constructed using an integrated circuit containing four operational amplifiers. A separate power-amplifier stage is also included.

as switches, transistor power dissipation is minimized. Thus the controller could also be used for the efficient control of

such resistive loads as heaters.

This work was done by Rodney W. Clukey of Rockwell International Corp. for

Marshall Space Flight Center. For further information, Circle 10 on the TSP Request Card.
MFS-29102



Electric Auto Association

MICHAEL P. BROWN
DONATIONS OFFICER

P. O. BOX 1113
FELTON, CA 95018-1113

(408) 429-1989

IS THIS THE CAR YOU'VE BEEN WAITING FOR?

Are you an EAA member who does not yet own and drive an EV, but would like to? This information is for you.

I know you're out there. I see you at the meetings and at the rally. You would like to drive an EV, but the job of doing your own conversion or the price of an already converted car puts an EV out of your reach.

This is your opportunity to get into an EV at a very low cost. A 1968 VW Bug, which has been converted to an EV using a Kaylor Kit, has been donated to the EAA by its owner/builder, Ron Cantoni.

This is a very clean conversion. Speed control is by series-parallel switching from 18v to 36v. The motor is a G.E. 2CM76 with cooling fins and fan mounted. The main battery pack of 12 batteries is in the back seat area, with the auxiliary battery, its charger, and the 36v charger under the hood. The instrumentation is an analogue 1.2 k amp ammeter, a temperature gauge, and an LED digital voltmeter with a 5-position rotary switch. All documentation from the conversion is provided.

The car has four good Michelin steel radial tires and a spare. The body is in good shape, and the white interior is spotless. It has new carpets, an AM-FM stereo cassette deck, and a heater.

The Electric Auto Association would accept a bid of \$600 for this car, which Mr. Cantoni paid a total of \$3391 to buy and convert.

The vehicle needs a new battery pack to be a running EV. In the table below, I have shown the costs of time and materials necessary to restore the vehicle to running condition.

COST OF BASIC RESTORATION*

'68 VW Bug	\$ 600.00
12 Alco 2200 Batteries @ \$39.50 ea.	474.00
Freight @ \$4.00/Battery	48.00
Installation	45.00
Sales Tax	69.81
Total Cost	<u>\$1236.81</u>

Since the main battery pack potential is 72v, you have the opportunity to upgrade the vehicle with a PMC solid state control system. The costs of this upgrade are shown below.

COST OF UPGRADE TO 72 VOLT SYSTEM*

'68 VW Bug	\$ 600.00
12 Alco 2200 Batteries @ \$39.50 ea.	474.00
Freight @ \$4.00/Battery	48.00
Lester 12v/72v Charger	450.00
Freight for Charger	15.00
Inductor	100.00
PMC-21 Controller	670.00
Misc. Wires, Connectors, Etc.	25.00
Installation	135.00
Sales Tax	150.74
Total Cost	<u>\$2667.74</u>

If you desire a truly state-of-the-art EV, a China Motor could be installed along with the PMC control system. The costs of this upgrade are shown below.

COST OF UPGRADE TO 72 VOLT SYSTEM WITH CHINA MOTOR*

'68 VW Bug	\$ 600.00
12 Alco 2200 Batteries @ \$39.50 ea.	474.00
Freight @ \$4.00/Battery	48.00
Lester 12v/72v Charger	450.00
Freight for Charger	15.00
China Motor	795.00
PMC-21 Controller	670.00
Less Motor/Controller Package Discount	<100.00>
Misc. Wires, Connectors, Etc.	25.00
Installation	225.00
Sales Tax	189.41
Total Cost	<u>\$3491.41</u>

For an investment of from \$1236.81 to \$3491.41, you could be driving an EV, as well as contributing to the EAA.

Call me at (408) 429-1989 and let's talk about it.

* Parts and labour prices are from Electro Automotive. Delivery is available from Electro Automotive's Santa Cruz facility to anywhere in the San Francisco Bay area for \$45.00.

KIPLINGER PUTS EVs SOLIDLY IN ⁶ THE U.S. FUTURE

Kiplinger a prestigious group of observers of U.S. business, government and technology trends, has published a book called "The New American Boom". The following is a few Key notes from a two page article in "Electric Vehicle Progress".

BATTERY POWERED VEHICLES MAY REVOLUTIONIZE THE WORLDWIDE AUTOMOBILE INDUSTRY BEFORE THE TURN OF THE CENTURY!!

Hints at secret "Super Battery" research & Development. 1,000 lb. cars will run 1,000 miles @ up to 100MPH without refueling. Specialty EVs first as HYBRIDS will make a large impact before the year 2000. plus most of the performance EAA members have only dreamed of. "One of the Nation's Oldest and most Reliable Newsletters." Quote from THE WALL STREET JOURNAL!! (ed: except for the EAA newsletter of course). I believe, how about you?

U.S. ELECTRIC VAN CON'T

Cars and Concepts, Inc.(C&C) of Brighton, Mich., a leading designer and producer of limited production and specialty vehicles for major U.S. auto Manufacturers, has been chosen to conduct the design and manufacturing study. Lucas Chloride EV Systems, Ltd. of Birmingham, Eng. will be

the subcontractor for the electric powertrain and batteries. During the six-month analysis, C&C and LCEVS will develop a van design, define production plans, and determine a van pricing structure. A key element in the electric van design will be the electric drive system developed by LCEVS. This proven technology has been used successfully in more than 500 British built electric vans operated in the UK. An additional 31 units are undergoing evaluation by electric utilities in the U.S. and Canada. Plans call for C&C to integrate the LCEVS electric drive system with a full size GMC truck, 125 inch wheelbase van. This design will be evaluated for production and marketing feasibility. The electric utility industry will play a major role in getting the electric van on the road. The EPRI of Palo Alto will assist in funding the vans technical development and testing. The EVDC of Cupertino, will assist project managers, undertake market development, and oversee van sales and service operations.

"By working together to build and market the electric van, the team of EPRI and EVDC representing the utility industry, and C&C, GM, and LCEVS from the auto industry are helping to develop a clean running, energy efficient option for tomorrow's transportation," says L. O'Connell, Manager EPRI's Electric Transportation Program.

The propulsion system is designed for installation in a Ford Aerostar van. Since the vehicle is intended only to be a test bed for the evaluation of the propulsion system, no modifications of the base vehicle characteristics or structure are planned except those required for propulsion system mounting. Figure 5 illustrates the planned configuration of the propulsion system in the test vehicle.

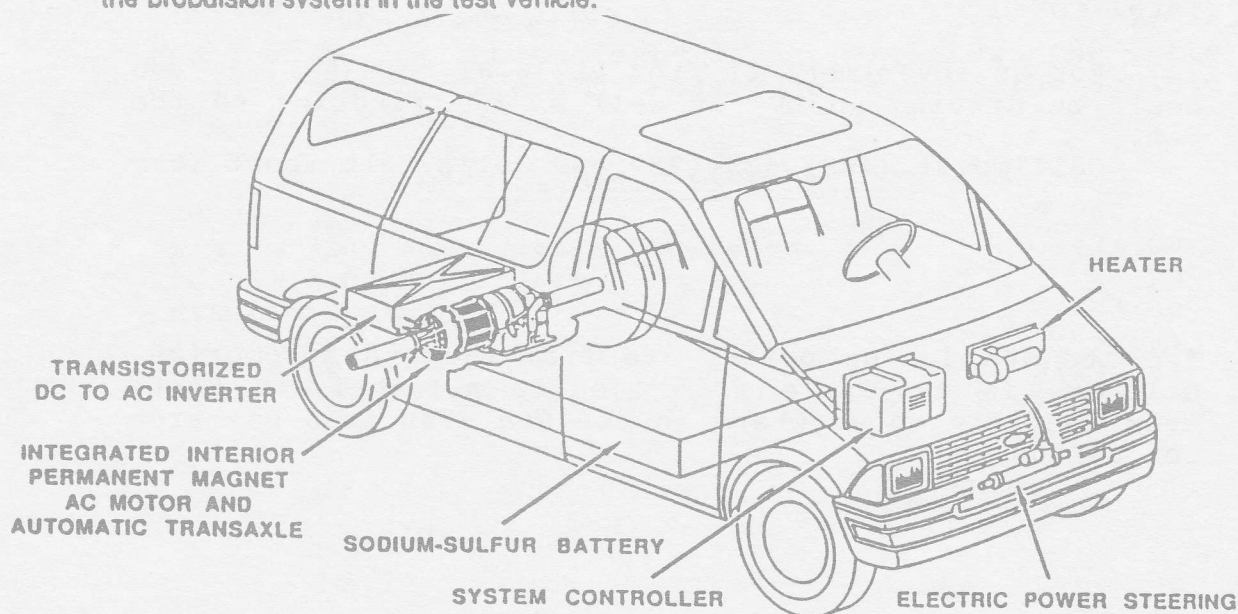


Figure 5
ETX-II SYSTEM IN TEST VEHICLE

IT'S 1987: DO YOU KNOW WHERE YOUR EAA IS GOING?

By Michael P. Brown

To paraphrase: it is the worst of times and the best of times for the EAA. Gasoline prices are down, and so is interest in electric vehicles. However, we are being told of permanent magnet motors and sodium-sulfur batteries coming in less than the usual three to five years. Our present vehicles are as efficient as they can be within the limits imposed by our lead-acid batteries. Yet, most of the people won't believe that that range is sufficient for 90% of their needs. Waste oil and used anti-freeze are being added to the list of poisonous by-products of our gasoline-based transportation, right behind carbon-monoxide and nitrous-oxides from the exhaust. On the other hand, more safe, non-polluting power sources are coming on-line every month. The U.S. government and most of the major automobile manufacturers are ignoring electric vehicles, but Stanford University has started an electric vehicle program.

That's quite a list of plusses and minuses, but I feel that the plusses come out ahead. What will it all mean for the EAA?

The major problem facing the Electric Auto Association is a lack of direction. Are we going to continue to pursue the technical aspects of electric car conversion and construction, or are we going to emphasize public awareness and educational programs? Or are we going to do both? Nobody knows, no goals have been set, no policies have been laid down. In other words, what energy we expend is wasted because it has no focus.

In an attempt to deal with that problem, set down some goals, create some policies, and find our direction, the Santa Clara Chapter of the EAA, with the co-operation of Stanford University, is holding a one-day workshop on Saturday, January 24, 1987. Workshop times and specific directions will be given in a special mailer to be sent out the first week in January.

All EAA members are urged to attend, especially those members of chapters in the San Francisco Bay area. Members who cannot attend due to previous commitments, or who live in areas too distant to make attendance practical, are urged to contribute their thoughts and opinions by letter or phone to the address or phone number listed below.

It is my feeling that, with one day's constructive discussion, we can arrive at some goals which will enable us to advance the cause of electric vehicles, and at the same time make our association an exciting place

to be. We need everybody's input and participation to make this work. If you get this newsletter the first week in December, you will have over a month to plan for your attendance or send me your ideas.

I hope to see you there or hear from you by phone or mail. I can be reached at (408)429-1989 8:30 to 5:30 Monday through Friday. If you get an answering machine, please leave a message and I will return your call as soon as possible. My mailing address is P.O. Box 1113 Felton, California 95018-1113. Remember, it is your organization; you will get out of it what you put into it.

EV Marketplace

FOR SALE

Joe Lester Battery Chargers, with timers, \$50 ea. one 48V/25A & one 36V/12A, 2CM76 motor rewind to series W/Mount \$150, 2CM76 motor mount \$50, 2CM76 Armature \$50, Two used forklift Motors 72V \$150 + shipping. Joe White, PO Box 605 Maricopa, CA 93252, (805) 769-8319.

FOR SALE

Willey 9-72V, 450 AMP. controller and accessories--fan, guages, main contactors, speed control, fuse link, relays. ALL NEW Sell for \$600 (\$1200 originally) CALL: Byron (415) 524-8047.

FOR SALE: 1982 Comuta-Car, white & white, W/PMC Controller. Baltimore Symposium Show Vehicle, under 1,000 miles. \$2500.

1982 Comuta-Van, White W/Red & Blue Strips, NOT a postal Van. Same Show, 72V. 3spd. under 1,000 miles \$3000.

1983 Ford Escort GLX Station Wagon, Eagle Picher conversion, Options, two-tone blue, 108V. 4spd. 65mph. 500 miles \$6500.

Ed Kreibick, PO Box 46208, Phila. PA 19160-6208 (215) 722-8378 Home; 324-1266 Work.

FOR SALE: 1980 Renault Le Car 2dr. factory conversion, 1300 miles, looks & runs like new. 16-6V Batts. 4spd. \$1,700-cost new \$12,000.

1976 Seabring Vanguard Citi-Car. Runs good, new brakes, \$650.

Chester E. Jones, 1116 Fairlawn Ct. Walnut Ck. CA 94595 939-2067.

FOR SALE: 1982 LECTRA D-100 (Datsun) P.U., 108V, less than 200 orig. miles, like NEW, \$2995. CALL: (414) 652-0750, Kenosha, WI

FOR SALE: 1981 Lectra Motors car, Cableform controller, Prestolite motor, Lestronic charger, radio. a give-away at \$988. Roger Smith, P.O.Box 16800 #273, Mesa, AZ 85202. CALL: (602)969-9667.

FOR SALE: 1972 Mazda RX2, 4 spd. trans., 30 HP 3600 RPM motor, 24-96 volts, 8-6V deep cycle batteries almost new, 48 volt charger, good body & interior. \$1250 OBO. Onst Burns (714)679-1603.

FOR SALE: 1969 OPEL KADETT L. FULLY ELECTRIC. Runs great- needs cosmetic work. \$3500 or trade for equal value. For more info CALL: (602) 778-3984.

FOR SALE

White Bradley GTE Electric, 120/240 volt Lester charger, 155 miles, AM/FM St. Cass. PINTO red electric, EVC transistor controller, 20 hp GE motor, 96 volt system, 9502 miles. JET INDUSTRIES ELECTRA VAN (Ford Courier) blue, 20 hp GE motor, 8631 miles, 240 volt Lester charger, 120V system, gas heater, GE SCR controller, AM/FM stereo cassette. ElectroMotive Systems, PO Box 1381, Oak Ridge, TN 37831-1381, CALL: (615) 986-5744 evenings.

FOR SALE: 1973 Mazda Sta. Wagon, 400A. Bendix Gen/M, 8 new Batts.+ new Aux. Batt. new paint, 48V Charger. \$1,000 O.B.O. Ken Edwards, 2116 N. 25th St. Phoenix, AZ 85008, (602) 275-6645.

FOR SALE: Dino Ferrari (Photo on pg.1), Fiberglass Kit/74VW Chassis, Baldor Motor, 72V, Wiley Controller, on-board charger, 2KW gas hybrid Gen. 12-6V Batts. All extras, Custom paint Cinnamon & Gold. Make an Offer.

L. E. Griggs, 623-2nd Ave. North, Edmonds, WA 98020. (206) 774-4626.

FOR SALE: 1980 Bradley GTII Electric, Factory built, less than 3000 miles, Good ALCO Batts. excellent cond. \$4500 or B/O, Also long list of parts & supplies Greg Whitney, (602) 978-3380 after 7PM.

FOR SALE: 1980 Bradley GTE II, Dual voltage GE EV1 48/96 volt Controller, 16 ALCO Batts, Tow bar, full set of manuals, White w/Red interior, Very nice Car. \$3900 Don Gillis (408) 225-5446

FOR SALE: 1969 Toyota 4-door Corona. Good body, new upholstery, new tires, completely converted to electric. 30 HP Prestolite motor, battery pack, transistor controller (needs repair), Lestermatic charger. Asking \$1500. Dan Logue 2320 Broadview Ave. Upland, CA 91786. (714)985-5496.

FOR SALE: Aztec 7, Fiberglass, gull winged, louvered back, 16 batteries, digital instrumentation, 2CM77 motor, MUST SELL!! any reasonable offer, (415)388-0838.

FOR SALE: 1972 Fiat coupe. Two-Motor setup, controller available, 72V system, previously owned by John Martin. Winner of the 1983 Rally, very good condition, asking \$600. Leo Schatzl, CALL: (714)984-6000

WHATS HAP'N

EAST BAY & CONTRA COSTA CHAPTERS

Dec. 13th, PG&E Service Center, 4801 Oakport St. Oakland.

Russ Kaufman will join us to discuss his latest undertakings

DENVER

The Annual DEVC Christmas Party is presently planned for Sat. Dec. 13th, during the afternoon & early eve. at the home of Tim & Genny Clark, 11768 Delaware Ct. in Northglenn. Mark your calendar!

Peninsula

Annual Christmas Party; Sat. Dec. 6th #8 San Juan Ave, Daly City, 94015. RSVP NOW!!

CALL: Mae Bensen (415)992-5453

INTERNATIONAL

RALLY & SYMPOSIUM 1987

AUG. or SEPT ?

DENVER



PLEASE!! Send meeting info and EVents by the 10th for the following month
REPORTING INCREASES ATTENDANCE!!!

EAA Chapters

Call the contact person for meeting times and places.

ARIZONA: Phoenix

Roger Smith 602 969-9667
P.O.Box 16800 #273
Mesa, AZ 85202

OREGON: Willamette

Leslie Brumbridge 503 - 7 871
4040 Gary St NE
Salem OR 97303

CALIFORNIA:

Burbank
Irv Weiss 818 - 841-5994
2034 N Brighton #C
Burbank CA 91504

TEXAS: Houston

Ken Bancroft 713 - 729-8668
4301 Kingfisher
Houston TX 77035

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5011 9th NE
Seattle WA 98105

WISCONSIN: Milwaukee

Dave Pares 414 - 481-9655
3251 S Illinois
Milwaukee WI 53207

NEW JERSEY: Hackensack

Kasimir Wysocki 201 342 3684
293 Hudson St
Hackensack NJ 07601

Vancouver, BC

Bob Rickey 590-1188
7160 152nd St Surrey

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6841 Jardines Dr.
Hunt. Bch. CA 92647

Denver, CO DEVC

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Fox Valley IL

John Stockberger
25643 Nelson Lake Rd.
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Palo Alto CA 94306

For information on forming a chapter in your area write Electric Auto Association, 1249 Lane St. Belmont, CA 94002. For a sample copy of the newsletter send SAE #10 envelope.

PHONE (415)591-6698

EDITORS: - Walter Laski - John Newell - Bill Palmer - Paul Brasch - COMPILED AND PUBLISHED By Clarence Eilers. SEND IN YOUR PERSONAL AND CLUB NEWS AND COMING EVENTS. ARTICLES _ COMMENTS etc. all correspondence to address below.

Electric

Auto



Association

NEWS

DECEMBER 1986

1249 Lane St.
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