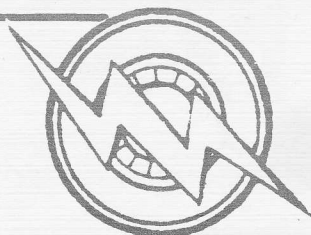


Electric Auto



NEWS

August 1983

Association

Vol. XV No. 8



VICTOR WOUK

SYMPOSIUM

HAS AGREED TO BE THE KEY SPEAKER
Dr. Wouk designed & built the HENNY
KILOWATT which was the beginning
of the new EV age. He is recognized
worldwide for design of Hi-Powered
DC Controllers.



SEPT 10 11
ELEVENTH ANNUAL

There's no Time Like the Present.

WE NEED TO KNOW NUMBERS NOW PLEASE !!!!! REGISTRATION \$8.00
SAT. NITE DINNER - dutch - HOW MANY? BRUNCH \$10.95

CAN YOU SAVE MONEY ?

Last month we tried to give you some idea what it cost to convert an internal combustion car into an electric. Now we would like to give you some idea what the costs per mile are to drive an electric. We will not endeavor to compare costs with a gasoline car. Most of you will probably compare it with your costs and rationalize in your own way. However ponder this a little and sharpen your pencil for some realistic figures of your own. This might save you a bundle over the years.

Our example, Mr. Steve Post's electric car, goes 50 miles per day from Pleasant Hill to Berkeley, CA., five days a week and has accumulated 42,000 miles. The driver says he simple "drives". He plugs the car in when he gets out at home and at work. His car gets no special attention. He uses a rate-of-rise cut off charger manufactured by Penta. This type of charger is important to keep battery costs down. Every two thousand miles he adds water. His rates for power are 5.418¢ per kw-hr for the first 240 kw-hr each month and 7.047¢ for any additional kw-hrs. Mr. Post reports his costs per mile for the last 20,000 miles are as follows:

Electricity	1.4¢/mile
Battery water	0.1
Battery Maintenance	3.4
Motor Maintenance	.0
Insurance	1.3
Misc.	1.7
Total Costs	7.9

Your gas & oil _____
Your antifreeze _____
Your battery maintenance _____
Your tuneups & overhaul _____
Your insurance _____
Your brakes & tires _____

Your total costs _____

Come now, don't kid yourself about your gasoline car costs, put some numbers up there right now! The U.S. Dept. of Transportation said in 1974 that the cost total for a compact size car was 12.9¢/mile. My neighbor says his diesel costs 18¢/mile but what did you say!?:

EAA

1983

Electric Auto Association INTERNATIONAL



Saturday
Sunday

SEPTEMBER 10
11

Rally

SPECTATORS WELCOME - COME FOR A RIDE

REGISTRATION STARTS 7:30 a.m. FEE \$8.00 INNSBRUCK & MOFFET PARK DR. S.V.

START OF RALLY 9:30 A.M. to 12:00 LUNCH RE-START 1: PM to 3:30

PARTICIPATION PLAQUES WITH REGISTRATION: AWARDS AND DRAWING AT BRUNCH

REWARD



FOR THE CAR FROM THE FARTHEST DISTANCE!!!!

\$100.00-----1st. PRIZE

\$75.00-----2nd. PRIZE

\$50.00-----3rd. PRIZE

REGISTER AND COMPLETE ONE LAP
TO QUALITY.

ELECTRIC VEHICLE INDUSTRY

EAA a pioneer in the promotion of electric vehicles.

We're working with you to get
EVs into today's transportation.



ALSO, QUALIFY FOR DRAWING WITH VALUABLE
MERCHANDISE PRIZES, BATTERIES, CHARGERS,
ETC.. Zenith 19" color television

COMMERCIAL ENTRIES--gain exposure to hundreds of people actually
interested in electric vehicles, plus the media coverage. Compare your
car(s) with electrics designed and built by top silicon valley engineers
as well as the talents of our 2000 + membership.

FOR SUNDAY AWARDS BRUNCH RESERVATIONS: Contact
Pat Hardage, 1085 Tasman Dr. # 732 Sunnyvale, Ca. 94086

FOR FURTHER INFORMATION CALL...

CLARENCE ELLERS (408) 296-8532

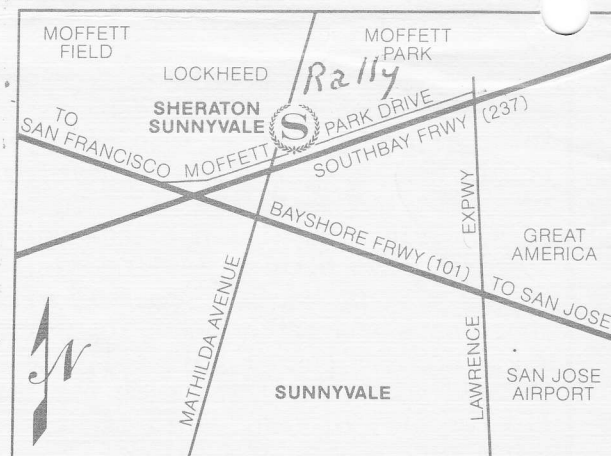
P.O. Box 2781 - Santa Clara, California 95051

SYMPOSIUM

BRUNCH

Sheraton-Sunnyvale

SHERATON HOTELS & INNS, WORLDWIDE
1100 NORTH MATHILDA AVENUE, SUNNYVALE CA 94086 408/745-60



REGENERATIVE BRAKING

By Charles Huntley

Of the many tricks we find to increase our distance of our electric cars, regenerative braking is probably one of the most efficient. Not only does it increase the range, but it also decreases wear on the brakes and increases battery life.

The saving of brake linings is accomplished by not having to use the brake pedal as much. On my car, I can even completely stop the car without using the brakes. We all know that the waste of energy comes mostly through heat loss. This is also true with your brakes. If you have to use your brakes more often or press down harder on the pedal, the brakes will overheat, thus increasing wear.

The theory of increased battery life comes from the reversal of the chemical process. This can somewhat be explained by comparing to when the batteries sit for five minutes after a long discharge, they revive themselves. A constant drain without rest is hard on any battery. If you reverse this process as you do in regenerative braking this constant drain is reversed and is even better than resting the batteries.

The results of many tests, including my own reveal that you can expect from nine percent, which is what I experienced, to 20%. I suspect that the more efficient systems use a step up controller. This is accomplished by reversing the controller during regenerative braking.

Figure 1 shows a system that I have used in my VW dune buggy. It uses a 48v system, and during regeneration it splits into parallel and then the motor is looking at 24v. I get a peek of 400 amps at 27 v during regeneration. If I down shift twice, I can get twice as much regeneration.

I use a double pole double throw contactor, rated at 200 Amps continuous.

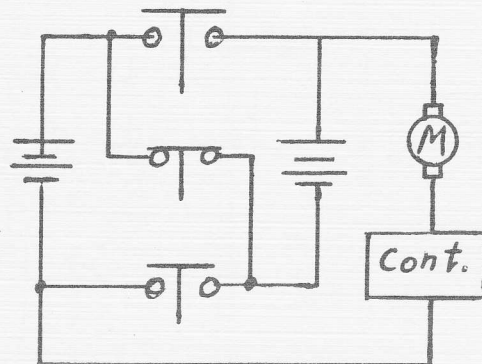
This was the only one available from Sigma. To operate the contactor, place a micro switch on the sliding potentiometer so that it operates at about 10 ohms.

I am using a Baldor 48v compound motor, with brazed armature. Although since the motor does not have to run at or above it maximum rating of 4500 rpm, there should be no problems. Other systems have a problem of over speeding the armature, since they must operate above 3500 rpm for regeneration.

When using this type of circuit design you must use separate field batteries. The reason being that if you tap the field off of the main pack, you cannot get the full 48v during regeneration. Even if you do tap off the main pack, there might be some loss through the field?

It is possible to use this system on a 72v motor. If you use the Baldor 7544D, don't use more than 72 v. If you do, you will not get the same results. This is because your motor will be looking at too much voltage in the battery pack. One other caution, the transistors in the controller must have a diode to pass the current the reverse direction around the transistors, otherwise you will burn out the transistors.

In conclusion, I consider this system to be very efficient and would never go back to any other system that did not give me at least 9 percent.



CHUCK USES THE WILLEY CONTROLLER
REVERSE CURRENT EATS TRANSISTERS

BE VERY CAREFULL. CLARENCE

WE WILL PROMOTE

ALL EVENTS

EAA OR NOT

SEND INFO. AT LEAST 2 MONTHS AHEAD

Digital Multimeters

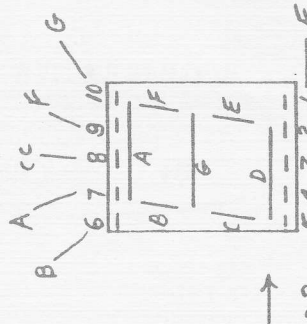
MODERNIZE YOUR CAR

Almost anyone can build this simple meter. On the .2 scale with a 500Amp. 50 MV. shunt the last 3 digits will read direct. I now recomend H.P. 5082-7633 Green digits, Green is much brighter in sun. Smoke colored plexiglas makes a good black out dash, very spectacular when lit up.

CLARENCE

Dwg #1

Fairchild
FND503
7 seg. LED

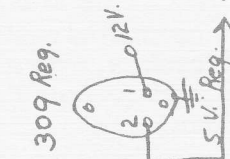
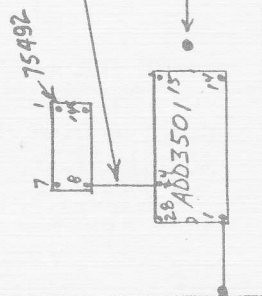


DP-54321-E

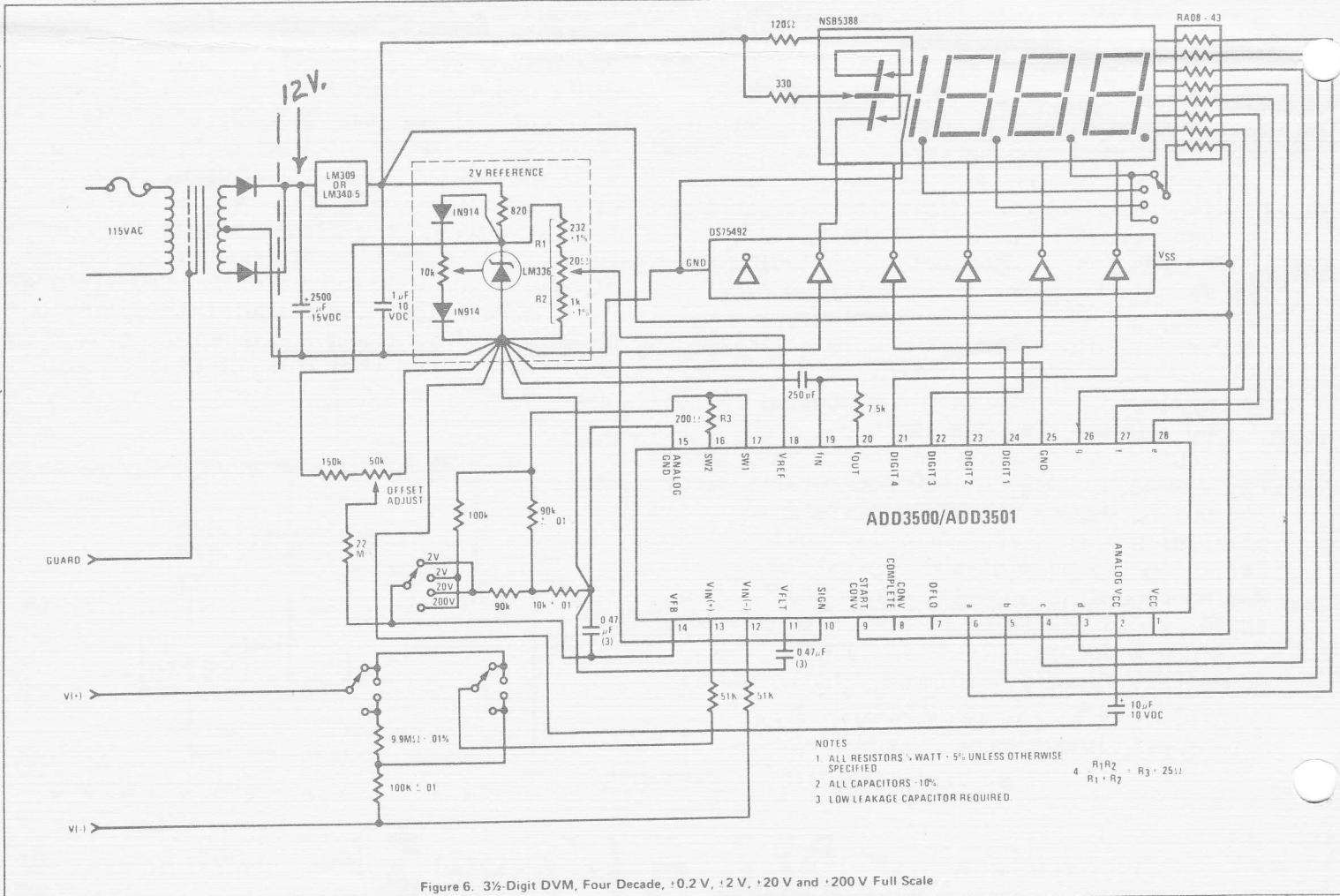
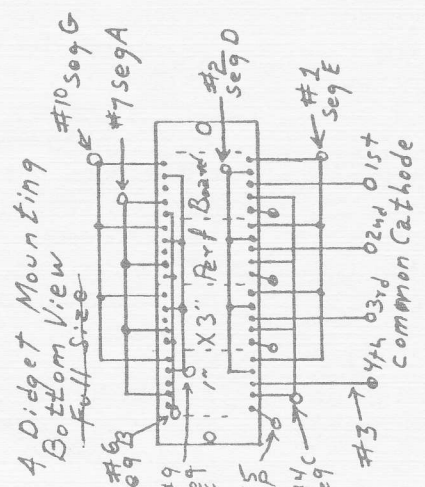
Bottom View

Layout for Panel Meter
3" X 3" Perfbord

Use Figure 5
Nat'l Note



Courtesy
National Semiconductor



- NOTES
1. ALL RESISTORS - 5% UNLESS OTHERWISE SPECIFIED
 2. ALL CAPACITORS - 10%
 3. LOW LEAKAGE CAPACITOR REQUIRED
4. $R_1 R_2 = R_3 \cdot 25$

Figure 6. 3 1/2-Digit DVM, Four Decade, $\pm 0.2V$, $\pm 2V$, $\pm 20V$ and $\pm 200V$ Full Scale

CHARGING

By CLARENCE ELLERS
PLEASE SEE SAFETY IN MAY ISSUE

A BATTERY CHARGER CAN BE ANY DC SUPPLY THAT WILL PRODUCE MORE VOLTAGE THAN THE FULLY CHARGED VOLTAGE OF THE BATTERY. THE CURRENT YOU CAN SAFELY USE IS DETERMINED BY THE AMPERE RATING OF THE COMPONENTS IN YOUR CHARGER, ie transformer, diodes, wire.

Electric car batteries are best charged at about 30 amps. At approx. 80% charge, current should be reduced to about 10 amps. If batteries bubble profusely or show any sign of temperature rise - they are either over charged or being charged at too high a rate.

The only test for charge is a hydrometer which measures the specific gravity of the acid. It is usually labeled 1250 which is 1.25. This is considered charged. A good hydrometer is a must. Those sold at most auto supply stores for \$1.50 to \$2.50 are almost worthless. Check the float, it must be small and rounded so it does not drag on the side of the tube. Go to a battery shop, check their hydrometer, (the one they use). You may have to have them order you one. The cost is \$8.00 to \$10.00.

COMMON CHARGER CIRCUITS

To determine the AC voltage needed, multiply the number of cells by 2.2.

EXAMPLE: 2.2 volts per cell fully charged.

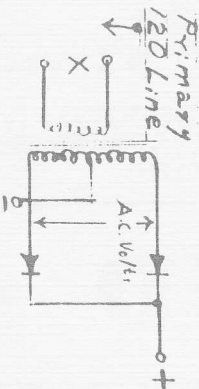
3 cells per 6 volt battery.

8 batteries = 24 cells

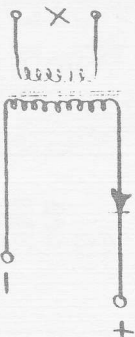
etc.

$2.2 \times 24 = 52.8$ volts.

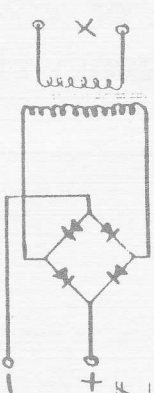
In other words if you have a 48 volt system (8 batteries) and your charger is 52 to 54 volts you can never over charge. HOWEVER NEVER TRUST ANY BATTERY keep watch when charging or use a timer.



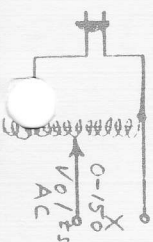
Full Wave
With Center Tap
D.C. Volts $\frac{1}{2}$ A.C. Volts



Half Wave A.C. Volts =
D.C. Volts But $\frac{1}{2}$ Time
Takes Twice Time To Charge



Full Wave Bridge
D.C. Volts = A.C. Volts
4 Diodes or Bridge Assem.



Variable (Variable Transformer)
Use To Vary Charging Current
Connect X to X on Charger Ckt.

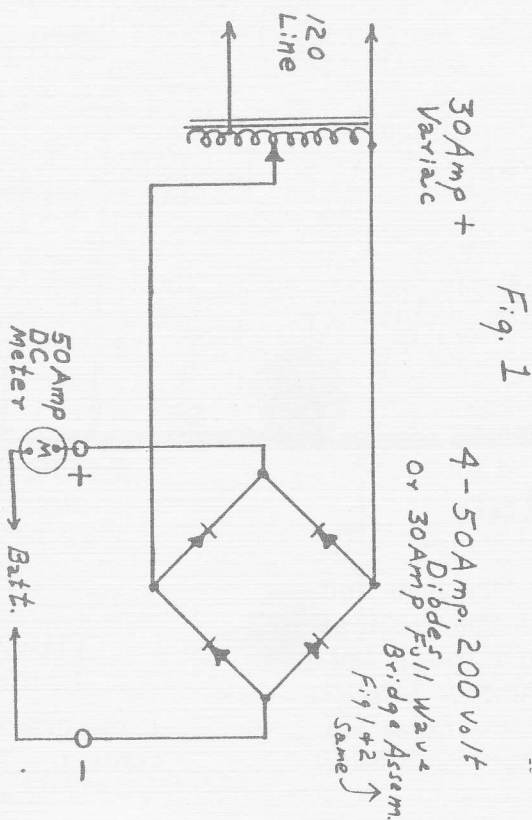


Fig. 1

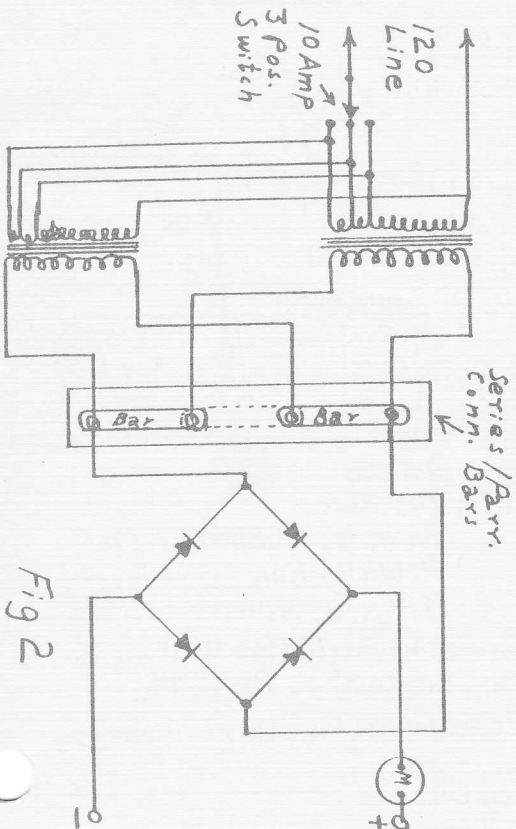
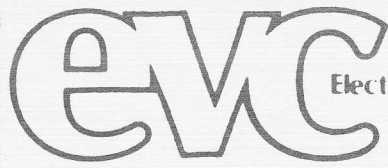


Fig. 2



Electric Vehicle Council

(202)828-7516

1111 19th. Street nw Washington, D.C. 20036

SYMPOSIUM & EXPO '83

Dearborn, MI Hyatt Regency Hotel
October 4-6, 1983

OAKLAND Rally

VEHICLE REGISTRATION

RUN VEHICLES

2.5 HOURS

LUNCH

1.0 HOURS

RUN VEHICLES

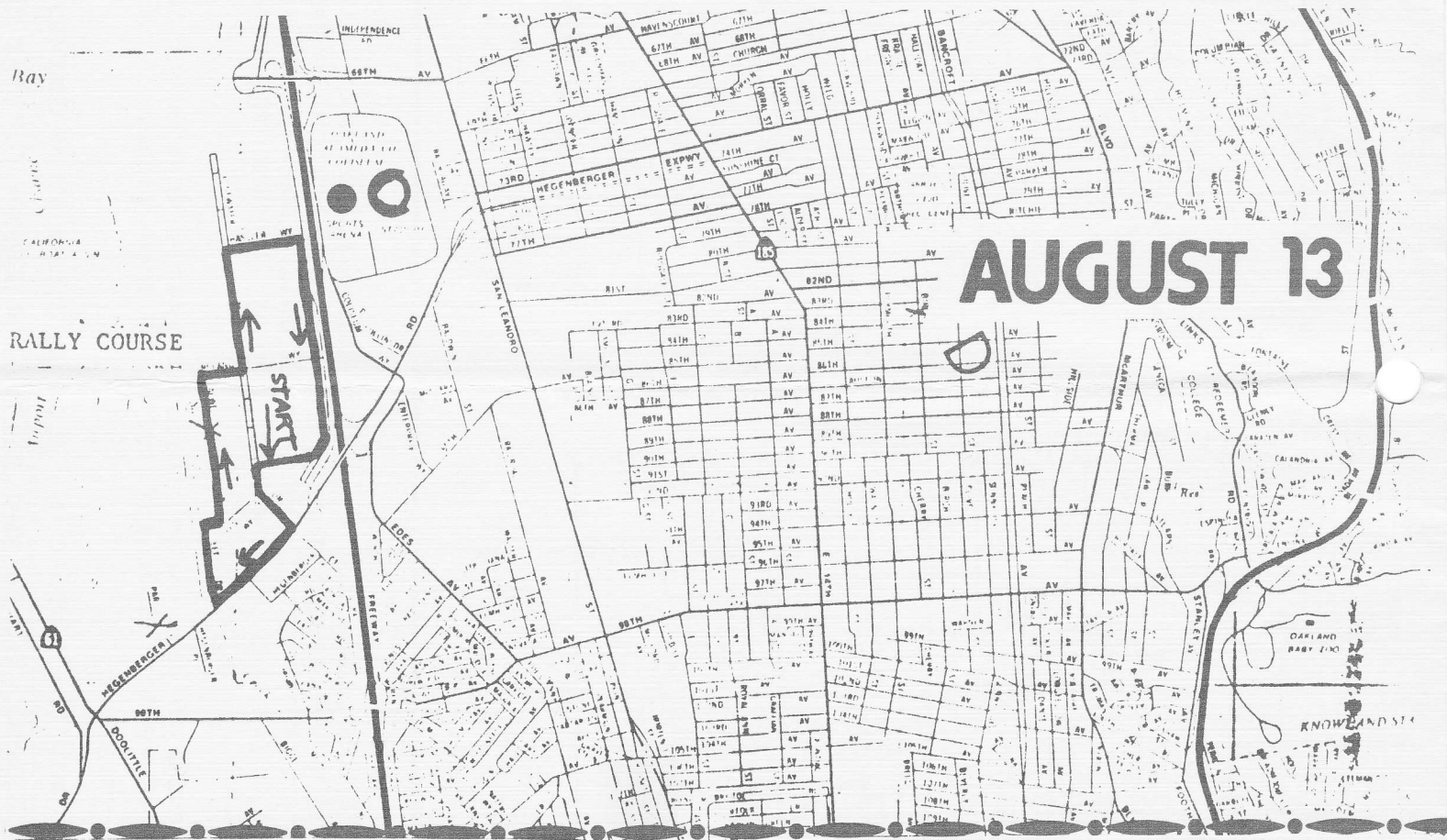
2.5 HOURS

8:30 AM

9:30 AM TO 12:00 NOON

12:00 PM TO 1:00 PM

1:00 PM TO 3:30 PM



Publicity Run

All Chapters are invited for Dry Run and Publicity Run to San Francisco. The start is at San Jose Airport Short Term Parking Lot. The finish is at San Francisco Airport Economy Parking Lot. The route is on 101 highway or Bayshore approximately 35 miles in distance one way.

The purpose in having this publicity run is to advertise our 11th Annual Electric Car Rally we will be having in September.

Starting Times: 9:30am

Dates: Dry Run

Saturday, August 27, 1983

Publicity Run

Saturday, September 3, 1983

11th Annual Electric Car Rally

Saturday, September 10, 1983

If you plan to participate for either run please contact:

Chuck Olson

3087 Taper Avenue

Santa Clara, CA 95051

(408) 296-6944

Come One Come All and Have Some Fun!

EV Marketplace

SPEED CONTROLLERS (Willey Model 9)
and motor-mounting adapters and
couplings - Call or write:
Bill Palmer (415)948-7677
44 Dior Terrace, Los Altos, CA
94022

'69 TOYOTA GE 2CM77 Motor Heavy Duty Cutler
Hammer Contactors 2 speed 36 V system
(12 batteries) Provision for 16 batteries
if desired. Regenerative Braking-Batteries
In Trunk & Under Hood-48V Ferro Resonant
Charger (On Board) PRICE: \$750 (201)741-4530

69 Toyota GE 2CM77 Motor Heavy duty
Cutler Hammer Relays, 2 speed 36V
system(12 Batts.)Provision for 16
Batts. if desired. Regen. Braking
Batts. in trunk & under hood. 48V
ferr. resonant charger(on board)
\$750- Call (201)741-4530 Robert.

'73 SUBARU 4-Speed. GE 2CM77 Motor. (8)
Gould (6)V 220 batteries. Voltage switching.
On Board Charger Gould 80AMP 12V \$2000.
Paul Hatleberg (608)362-6752-Beloit, WIS

If you wish a boy to help you take
out motor parts this summer call:
(415)861-5627 JOBS

'69 VW, 2CM76 Motor, Willey controller,
\$1,200/offer. 2CM76-\$150. Call:
(509)357-1280

STAN SKOKAM REPORTS THAT GLOBE UNION NOW
HAS MAINTENANCE FREE DEEP CYCLE BATTERY.
106 min. at 75amps (EV106) \$99.00

DIGITAL S.O.C. GAUGES, new design.
have LED bar-graph display, alarm
system, and more. Available for 12
to 120V in 6V increments. \$99 ea.
(1-9) Write for info: KTA SVCS.,
PO BOX 1024, Tustin, CA 92681

LEARN WHILE YOU SAVE

Willey Solid State Model 9 Con-
troller Kits to 450A & 120v.
Easy assembly, quality components,
clear manual. Also blowers,
contactors, meters, foot-pedal
controls, fuses, etc. Write or
phone for catalog.

SALE! 15% off on all orders which
include a Controller Kit. Ends
Sept. 30th.

BREWER ASSOCIATES 21511 Deerpath Ln.
213-456-6236 Malibu, CA 90265

'68VW BUG w/79 Kaylor conversion,
2CM76 Motor, excellent, \$1650 must
sell. (415)966-2858 (days)
(415)252-2920 (eves)

ELECTRIC MG: CM76 Motor and Charger.
\$750 also SCR & Misc. parts - CHEAP
(415)658-6586

69 VW, 2CM76 motor, Willey Cont.
\$1200/offer. 2CM76 \$150.
(509)357-1280 Dale.

ADS must be received with payment by the 10th. of the month, for the following month's
issue. AD rate is min. 1 to 5 lines \$5.00, 1/4 Pg. \$15.00, full Pg. \$50.00, full Pg.
2 sides \$80.00. Wanted, Trade, For Sale, etc. Mail to EAA 1249 Lane St. Belmont, CA.
94002

EV Marketplace Con't.

Lestronics II 36V, 40 Amp Charger with cables, J&H Generator W/VW Trans-axle adaptor & Blower. \$550/best offer Call (817)939-2660, eve. 509 Pecos Belton, TX. 76513

Lectric Leopard (like new) 1980 Deluxe 1500 Mi. \$6000 D. Fair RD#5 Box 112A Greensburg, PA. 15601

RECENT MEETINGS

JUNE 11 - A Show was held at Sears Southland in Hayward, Calif.

CARS: Mueller - Datsun
Wasylina - Honda
Wenzel - Vega
Huntley - VW Dunebuggy
Brobeck - Citation Hybrid
Schaeffer - Renault
Tillin - Honda

About 200 - 300 persons saw the cars and asked questions.

MAZDA RX2 W/Prestolite motor, GE EV-1B Cont., Accel. SW. Modules, etc. 14 Trojan J-250W; 6V Bat. Steel Belt-ed radials meters in panel, 2/0 wire Lester Mod. 9350 12/84V Charger, & To Bar. Exc. Cond. Low Mi. \$1500. or offer. SEE at Steve Kaiders 773 Vista Grande, Los Altos, CA. Call (415) 961-5198 .or call John McCarley (408) 724-2659, 427 Allen Ln. Corralitos, CA. 95076

Sunbeam Imp 1965, 48V Relay-Rester system, Baldor 3.2HP motor. All new interior, Michelin tirea, brakes & EV1000 Batts. \$1800 or over call (619) 566-6013, or eves. (619) 566-0328

Keeping Your Finger on the Pulse

AET (Alternate Energy Transportation) Newsletter tracks auto fuel options such as battery power, hydrogen, propane, methanol, CNG, etc., providing news, evaluations, forecasts, opinions. Concise, authoritative, monthly, cheap. Send \$40 now for one year (\$50 foreign) or \$3.50 for sample, to:

Ed Campbell, AET Newsletter

327 Central Park West

New York, NY 10025

(Formerly "CHOPPER NOISE")

THIS MONTH

OAKLAND

EVENT

Call Chuck after
6 p.m. (415) 431-8179 for
more information

AUGUST 13

EASTBAY CHAPTER RALLY

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

Electric
Auto



Association

NEWS

AUGUST 1983

1249 Lane St.
Belmont, Ca.
94002

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ORGANIZATION
U.S. POSTAGE

PAID

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