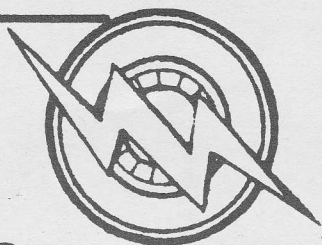


Electric  
Auto



NEWS

JUNE 1984

Association

VOL. XVI NO. 6

TWELFTH  
ANNUAL

INTERNATIONAL

SYMPOSIUM  
Rally

SUNNYVALE CALIF.

CALL (408)248-2588

This year, more than ever, we need NUMBERS. I beg everyone who has an EV, or knows someone who has an EV, to bring it to our '84 RALLY. If it only goes one lap-BRING IT. The visitors and media are impressed by the number of ELECTRICS. We must show that THE ELECTRIC VEHICLE IS ALIVE AND WELL.

The government has thrown down the gauntlet and the Power Co's have risen to the challenge by forming the EVDC ELECTRIC Vehicle Development Corp. We must show them that we are READY, WILLING, AND ABLE TO HELP.

SEPT

8 & 9th

## REMOTE MEMBERS ATTN!!

The EAA is forming OUT BACK CHAPTERS, grouped by zip with an approx. 100 mile radius.

Ivan Marts is setting up this project. Ivan is one of our most knowledgeable members, and belongs to a very exclusive group--he owns only an ELECTRIC Vehicle, a Jet Van which he drives exclusively.

The basic idea is; soon one member from each group will receive a letter from Ivan. This letter will circulate around the group twice so that each member can add his contribution of EV related activities. Each member will, on the second time around get the benefit of what has been added. When the letter is returned the second time to the originator they will copy it and send to John Newell.

It is hoped that each group will plan a meeting, field trip, picnic or other activity at least once a year. Each chapter's events will be promoted and reported in the EAA NEWS the same as any other chapter.

For further information or input contact Ivan Marts (408)943-1102 1904 Treewood Ln. San Jose. 95132

## LEGISLATION

CALIFORNIA LEGISLATURE—1983-84 REGULAR SESSION

ASSEMBLY BILL

No. 3630

Introduced by Assembly Member Leonard

February 17, 1984

### LEGISLATIVE COUNSEL'S DIGEST

AB 3630, as introduced, Leonard. Taxation: electric vehicles.

The existing Personal Income Tax Law and Bank and Corporation Tax Law authorize specified credits against the taxes imposed.

This bill would authorize a credit against taxes under the Personal Income Tax Law and the Bank and Corporation Tax Law in an amount equal to 55% of the cost incurred, as specified, by the taxpayer for the manufacture or conversion of an electric vehicle, as defined, but not to exceed \$3,000 per vehicle. The bill would provide the same tax credit to the original purchaser of the vehicle if the manufacturer or converter elects not to claim the credit.

The bill would take effect immediately - - - - -

AB 3630

Write to your assemblyman AND!!! your State SENATOR. A similar bill was defeated on the basis of lost revenue, please point out that due to the small number of EV's the cost would be almost nothing. Sign Mike Brown's letter, but also write your own. Don't forget THE LARGER OUR NUMBERS THE LOUDER OUR VOICE.

HELP !!

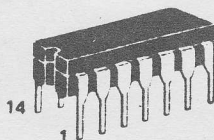
EAA BASEBALL CAP  
\$25 "RALLY" DONATION  
787 Florales Dr.  
Palo Alto, CA 94306

# Solid State Motor Controller

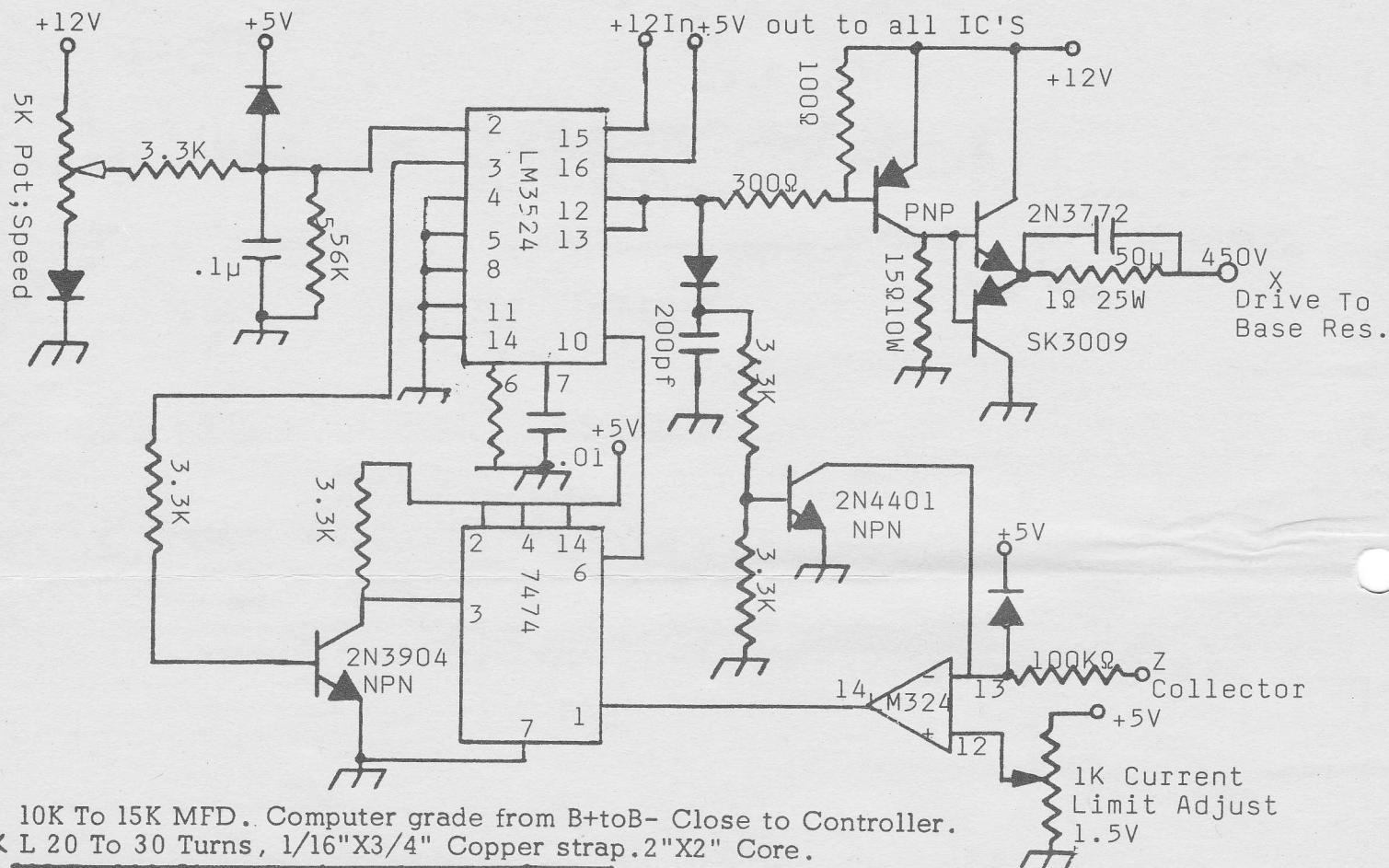


**BRUCE McCASKIE**

7 SOUTH HUMBOLDT  
SAN MATEO, CA 94401



347-1330



10K To 15K MFD. Computer grade from B+toB- Close to Controller.

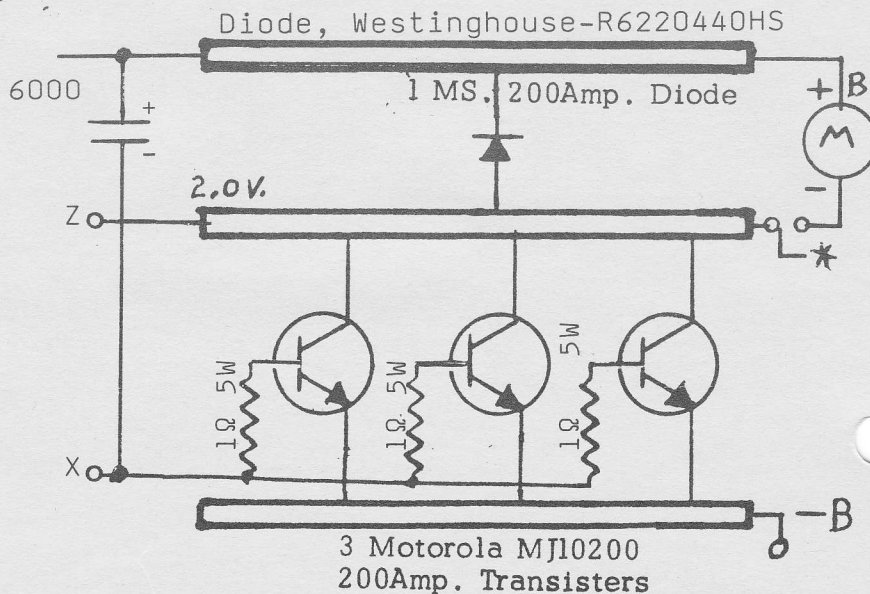
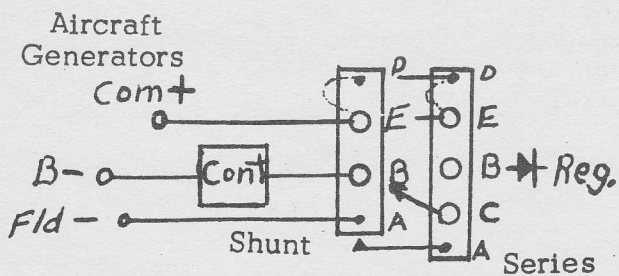
\* L 20 To 30 Turns, 1/16"X3/4" Copper strap.2"X2" Core.

LARGE HEAT SINK approx. 48 sq. inch.

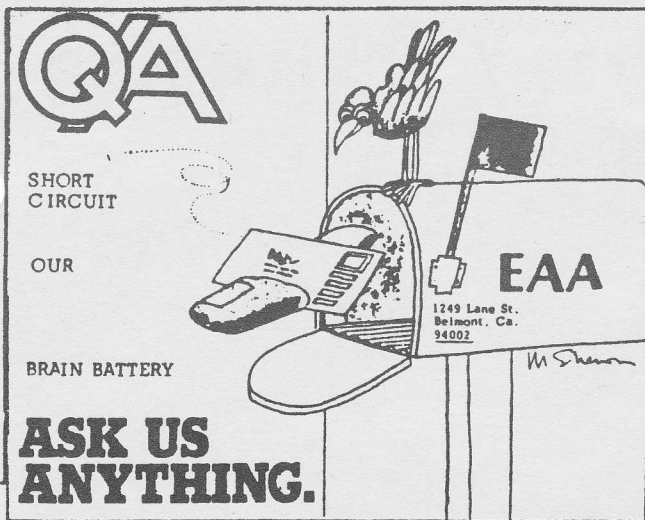
Rating: 2Khz, 72 V, 400AMPS.

Overload: Adl up to 450 "

Use 100Mh. Coil Aircraft Gens.







Q Hydrometer reading?

A Liquid level has nothing to do with reading unless, of course, you have just added water and then the reading is no good. You must circulate acid (charge & discharge) before reading hydrometer.

Q: Can you use  $\pm 10\%$  rated voltage on a motor?

A: Because of the back EMF you can run up to double the rated voltage on a DC machine. Remember the speed is proportional to the voltage. You MUST NOT run your motor over rated RPM.

Many of our members use 72 volts on 30 volt aircraft generators. The only problem with under voltage is speed and power.

## ELECTRIC EXPRESS FOR SALE • 1974 • TOYOTA PICKUP

- ENGINEERED/CONSTRUCTED BY RIC BARLINE - SES
- 2800 MILES SINCE 11/82 GROUND-UP CONVERSION
- PRESTO 21HP MOTOR w/CUSTOM ADAPTOR TO REBUILT STOCK 4-SPEED RUNNING GEAR
- 108 VOLT (18 ALCO 2200 6 VOLT DEEP CYCLE BATTERIES)
- SES 500 AMP TRANSISTOR CONTROLLER
- ONBOARD, DIRECT AC-DC CONVERTER CHARGER
- MASTER IN-CAB CIRCUIT BREAKER AND COMPLETE GAUGES
- HEAVY DUTY SUSPENSION WITH COIL-SPRING OVERLOADS
- TILT-UP CARGO BED FOR BATTERY ACCESS
- NEW PAINT 12/82 (STOCK TOYOTA DARK SILVER) WITH MATCHING STEEL 'SPOKER' RIMS
- NEW STRATTON STEEL RADIALS 3/83
- INCLUDES: 30 FT., 30 AMP (30 AMP HEAD) & 50 FT., 30 AMP (15 AMP HEAD) EXT. CORDS; SES MANUAL & COMPLETE HISTORY

**THIS LITTLE TRUCK IS DRIVEN DAILY AND OPERATES FLAWLESSLY. ITS RANGE IS 45-50 MILES IN THE CITY, WILL CRUISE COMFORTABLY AT FREEWAY SPEEDS AND WILL SMOOTHLY ACCELERATE TO 70MPH IN STARTLING QUIETNESS.**

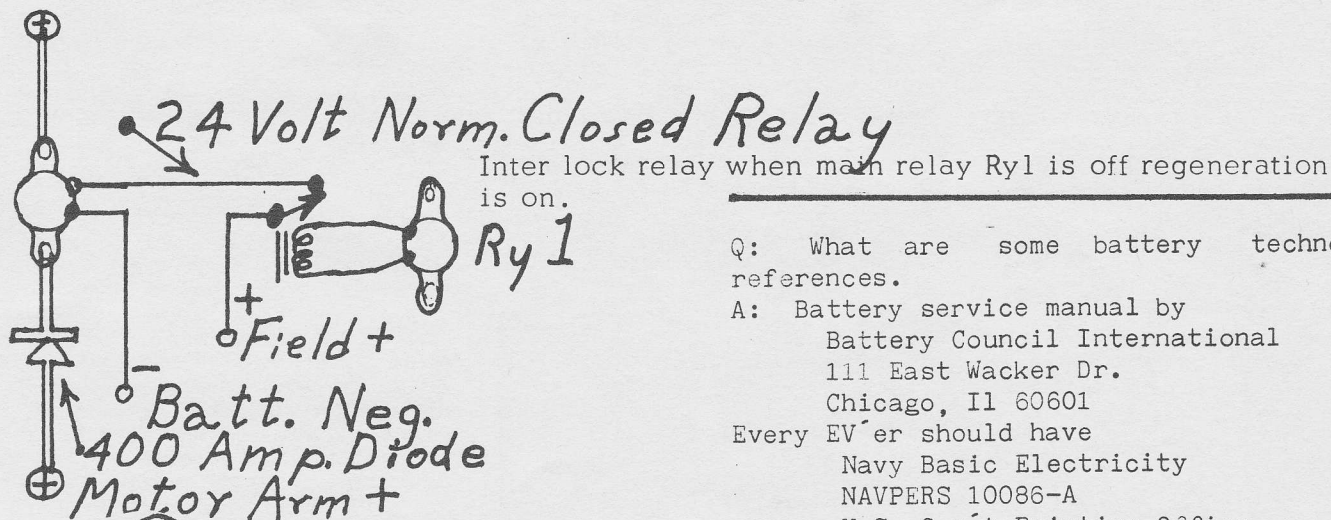
**\$6500 • FRED FORTUNE • (408) 723-1202**

Q Regeneration?

A Is extremely important to protect brakes - see previous question and read text of Nov. '83 regeneration article.

### REGENERATION:

**Batt. +** For dynamic braking and charging batteries while coasting.



**HELP !!**

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Q: What are some battery technology references.

A: Battery service manual by  
Battery Council International  
111 East Wacker Dr.  
Chicago, IL 60601  
Every EV'er should have  
Navy Basic Electricity  
NAVPERS 10086-A  
U.S. Gov't Printing Office

It covers everything on D.C. 19 pages on batteries.

# SERIES / PARALLEL BATTERY SWITCHING SPEED CONTROL

By Bill Palmer

## AUTHOR'S COMMENT

I have been using the control system described here in my 1972 Chevrolet Vega for over six years. I have found it to be practical, efficient, quiet and nearly trouble free. Only the contactors, being development prototypes, have needed minor modifications and occasional adjustment.

For me, the ability to brake regeneratively down to near zero speed balances out the stepwise speed control and the need to actuate the clutch for each voltage change. Also, the contactors will carry tremendous overloads without damage. I have drawn over 1000 amperes climbing steep hills. The 4/0 cables were warm and the motor was hot, but the contactors showed no damage.

I recommend series / parallel battery switching as an alternative to less flexible or more expensive electric car speed control systems.

Since operation of this system is slightly different from operating an engine-powered car, it may not appeal to the commercial market. But it certainly is suitable for any electric car enthusiast who is willing to learn a slightly different procedure.

## WHAT IT IS

Series/parallel battery switching is a method of applying different voltages to the traction motor to vary its speed and thereby vary the speed of the car. You know that when a number of similar batteries are connected in parallel the voltage is the same as that of each battery and the current, drawn by a load connected to the circuit, is divided approximately equally among the batteries. When batteries are connected in series the voltage is the sum of the voltages of each battery and the full current of a

connected load flows through each battery. When the batteries in your electric car are reconnected, as you drive, into several combinations of series and parallel connections you have a very practical and efficient method of controlling speed.

## HOW IT WORKS

Figure 1. shows a typical power circuit with a motor (M), a main contactor (MC), six batteries (B1-B6) and five double-throw contactors (C1-C5). Each battery shown can be several batteries permanently connected in series. Each contactor has two movable contact bars which make parallel connections when they are in the up position in the diagram. In the down position, the upper bar makes the series connection and the lower bar makes no connection. Contactors C1, C3 and C5 are shown in the parallel position. C2 and C4 are shown in the series position. Note that the two contact bars in each contactor are mechanically interlocked (indicated by the dashed line) to prevent the series contact and either parallel contact from being closed at the same time. If you trace the circuit you will see that, if that happened, one or more batteries would be short-circuited which would destroy the contactor, probably some cables, maybe some batteries and probably start a fire.

The same basic circuit can be used with any number of batteries. You need a contactor between each pair of batteries or series group of batteries. Note that there is no need to interlock the contactors with each other. Each contactor can connect the batteries on each side of it in either series or parallel without affecting the connections

of any other contactor or creating a short circuit.

The main contactor serves to disconnect the motor from the battery whenever the key-switch is off, or the parking brake is on, or the clutch is disengaged and the battery switching contactors are in the process of changing battery connections. This latter function prevents arcing of the battery switching contactor contacts by making and breaking the circuit only when it is not carrying load current.

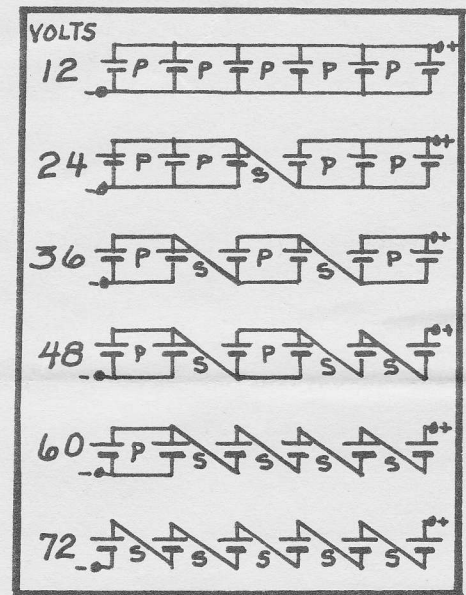


FIGURE 2.

## BATTERY CONNECTIONS

### CONNECTION COMBINATIONS

Figure 2 shows the voltage steps and the connection combinations which produce those voltages. The "P" or "S" between batteries indicates whether the contactor is in the parallel or series position to produce that connection. Note that in the 12, 24, 36 and 72 volt connections the load current can divide equally among all batteries. This means that all batteries are used equally in those connections. In the 48 and 60 volt connections some batteries are in series with others in parallel resulting in some unequal use. These two steps are included for smoother speed control but their time of use should be minimized. Other connection combinations are possible but these serve our purpose. Continued -->

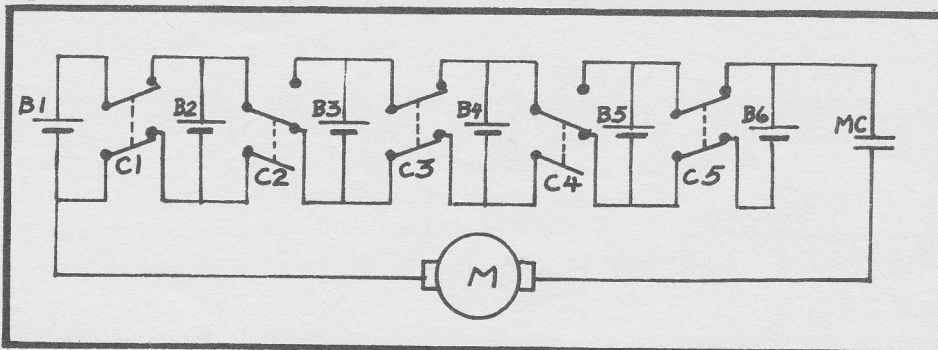


FIGURE 1. POWER CIRCUIT



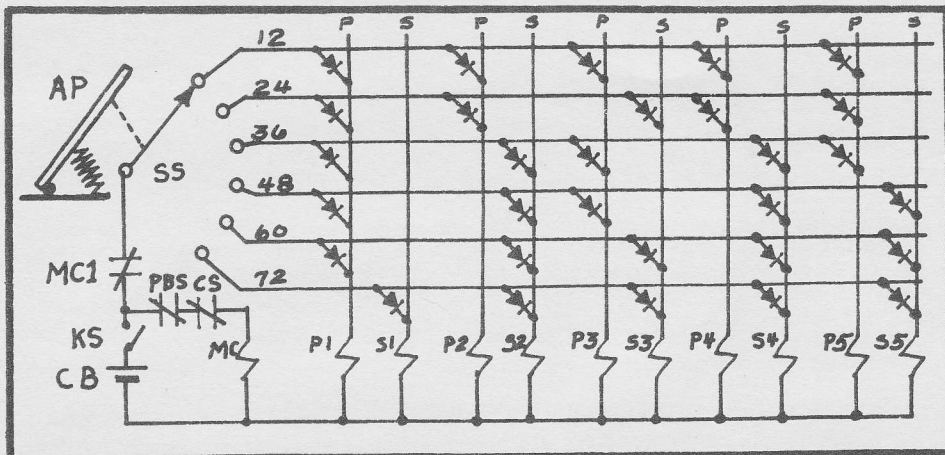


FIGURE 3. CONTROL CIRCUIT

#### CONTROL CIRCUIT

Figure 3 shows the circuit which determines which contactors are in the parallel or series position and thereby determines the voltage which the battery supplies to the motor. The accelerator pedal (AP) operates a selector switch (SS) which applies control voltage to any one of 6 input busses of the steering diode matrix. Diodes on the matrix connect the input busses to either "P" or "S" output busses to determine which parallel and series contactor solenoids (P1-P5 and S1-S5) are energized when each input bus is energized. The diodes "steer" control voltage to the desired coils for each accelerator pedal / voltage position and prevent voltage feedback.

Note, in the lower left corner of Figure 3, the control battery (CB), the key-switch (KS), and a normally closed interlock (MCI) on the main contactor in series with the selector switch. Note also the parking brake switch (PBS) which is closed when the parking brake is released and the clutch switch (CS) which is closed when the clutch pedal is released (clutch engaged). These two switches are in series with the coil of the main contactor. The clutch switch serves to deenergize the main contactor to close it's interlock so the battery switching contactor coils can be energized only when the main contactor is open. This prevents arcing and burning the contacts, as mentioned above.

The selector switch should have good detents, so you can feel the positions with your accelerator foot, but not so stiff as to require too strong a return spring on the accelerator pedal.

#### BATTERY SWITCHING CONTACTORS

I could not find any commercially-available, double-throw contactors which would maintain contact in both positions, which would carry 400 amperes and were small and reasonably priced, so I made some myself. See Figure 4. They are built in phenolic instrument cases about 6 1/2" by 5" by 2" deep inside. The two vertical bars in the center carry the movable contacts. They are hinged near the top with heavy braid across the hinges. Each bar has a toggle spring at its lower end which maintains contact pressure in either direction. A solenoid in each lower corner pulls an insulated operating plate to the right or left to change the movable contacts to the parallel or series connection respectively. They are shown in the parallel direction. The operating plate is also the mechanical interlock which prevents a parallel and series contact from closing at the same time. One battery connects to the movable contacts, at the top, and the other to the stationary contacts, near the center, as shown in the contact arrangements in Figure 1.

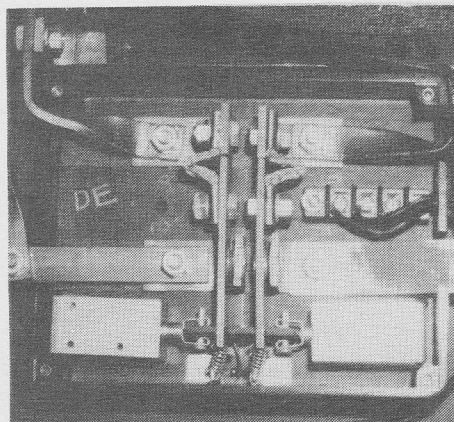


FIGURE 4. CONTACTOR

#### DRIVING WITH BATTERY SWITCHING SPEED CONTROL

With the parking brake set, clutch disengaged, your foot off the accelerator pedal (so the selector switch will be in the 12 volt position), turn on the key switch. Since the main contactor is open (because both the parking brake and clutch switches are open), interlock CMI is closed and the circuit energizes the contactor coils to switch the batteries to 12 volts.

When you're ready to go, release the parking brake. Then, releasing the clutch pedal will close the main contactor, start the motor on 12 volts with very little inrush current and start you rolling at low speed. It's all very much like starting an engine-powered car so far, except that the motor doesn't start until you release the clutch pedal.

Each time you want to change speed move the accelerator pedal to the next voltage position and press the clutch pedal briefly, just as though you were shifting gears. That causes the main contactor to open, closing interlock MCI, energizing the selected input bus of the diode matrix and the parallel or series output busses, as determined by the diode locations and energizing the proper solenoid coils to switch the batteries to the new voltage.

You don't have to use all of the voltage steps when you're accelerating or decelerating. To accelerate more rapidly you can skip one or more steps, but the high currents which result will reduce your range significantly.

The clutch switch should be adjusted so it operates when the clutch is fully disengaged. That minimizes motor inrush current and smoothes the speed changes. Except for having to actuate the clutch every time you change accelerator positions, the controls work very much like an engine-powered car. Of course, the voltage control is independent of the transmission and works the same in any gear.

When you decelerate, you get regenerative braking automatically whenever you switch to a voltage lower than the one corresponding to the car speed, if your motor is shunt wound and the field is separately excited.

I will try to answer any questions and will appreciate any comments.

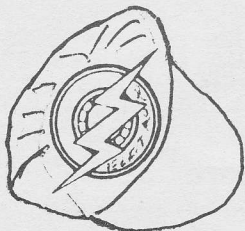
Bill Palmer

44 Dior Terrace, Los Altos, CA 94022

June 1994



HELP !!



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Palo Alto, CA 94306

|     |     |        |
|-----|-----|--------|
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| C   | I E | B      |
| C   | I E | B      |
| C   | I E | BR B   |
| C   | I E | BR B P |
| C   | I E | B      |
| C   | I E | B      |
| P   | I E |        |
| R D | E   | B P    |
| R D | E   | B P    |
| R D | E   | B P    |
| FWD | I E | BE BE  |
| FWD | I E | BE BE  |
| FWD | I E | BE BE  |
| FWD | I E | BE BE  |
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| FWD |     |        |

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R16  
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Madza  
Opel  
Peugeot  
Porsche  
Renault  
Saab

|             |           |             |        |        |       |                |
|-------------|-----------|-------------|--------|--------|-------|----------------|
| AMC         | Gremlin   | '71         | 6 Cyl. | 96"    | 2503# | C IE BR HE HD  |
|             | Hornet    | '71         | 6 Cyl. | 106"   | 2754# | C IE BR HE HD  |
|             | Gremlin   | '73         |        |        | 2674# | See Above      |
|             | Hornet    | '73         |        |        | 2948# | "              |
| Buick       | Skyhawk   | '76         | V6     | 97"    | 2871# | C HE HD        |
| Chevrolet   | Vega      | '71         | 4 Cyl. | 97"    | 2110# | C IE B BR      |
|             | Vega      | '73         |        |        | 2249# | See Above      |
|             | Monza     | '75         | 4 Cyl. | 97"    | 2500# | C B            |
|             | Chevette  | '76         | 4 Cyl. | 94.4"  | 1970# | C BN           |
| Ford        | Pinto     | '71         | 4 Cyl. | 94"    | 1949# | C IE           |
|             | Maverick  | '71         | 6 Cyl. | 103"   | 2478# | C IE BN HE HD  |
|             | Pinto     | '73         |        |        | 2124# | See Above      |
|             | Maverick  | '73         |        |        | 2728# | "              |
| Mercury     | Bobcat    | '75 (Pinto) | 4 Cyl. | 94"    | 2549# | "              |
| Olds        | Starfire  | '76         | V6     | 97"    | 2783# | C HE HD        |
| Pontiac     | Astre     | '75 (Vega)  | 4 Cyl. | 97"    | 2521# | C IE B BR      |
| Alfa Romero | Typ. All  | '71-        |        |        | 2375# | E P            |
| Arrow       | (Plymth)  | '76         | 4 Cyl. | 92.1"  | 2110# | IE             |
| Audi        | 90        | '71         | 4 Cyl. | 98"    | 2117# | FWD IE B       |
|             | Fox       | '73         | 4 Cyl. |        | 2442# | FWD IE B       |
| Austin      | Marina    | '73         | 4 Cyl. | 96"    | 2156# | FWD IE BR BE P |
| BMW         | 2002      | '71         | 4 Cyl. | 98.5"  | 2028# | C E BN         |
|             |           | '73         |        |        | 2260# |                |
| Colt        | (Dodge)   | '71         | 4 Cyl. |        | 2020# | IE             |
|             |           | '74         |        |        | 2205# |                |
| Cricket     | (Plym)    | '71         | 4 Cyl. |        | 1897# | IE             |
| Datsun      | 1200      | '71         | 4 Cyl. | 90.6"  | 1587# | IE C           |
|             | 1600      | '71         | 4 Cyl. | 95.3"  | 2039# | IE C           |
|             | PU        | '71         | 4 Cyl. | 99.6"  | 2127# | IE HD C        |
|             | 210       | '76         | 4 Cyl. | 92.1"  | 1897# | IE C           |
|             | F10       | '76         | 4 Cyl. | 94.3"  | 1970# | IE BR C        |
|             | 710       | '76         | 4 Cyl. | 96.5"  | 2299# | IE C           |
|             | 610       | '76         | 4 Cyl. | 98.4"  | 2395# | IE C           |
|             | PU        | '76         | 4 Cyl. | 100.2" | 2310# | IE HD C        |
| Fiat        | 850       | '71         | 4 Cyl. | 79"    | 1480# | RD IE B BE     |
|             | 128       | '71         | 4 Cyl. | 96.4"  | 1735# | FWD IE B BE    |
|             | 124       | '71         | 4 Cyl. | 95.3"  | 1962# | C IE B BE      |
|             | 850       | '73         |        |        | 1590# | See Above      |
|             | 128       | '73         |        |        | 1760# | "              |
|             | 124       | '73         |        |        | 2038# | "              |
|             | 128       | '74         |        |        | 1890# | "              |
|             | 124       | '74         |        |        | 2499# | "              |
| Honda       | 600       | '71         | 2 Cyl. |        | 1200# | FWD IE B P     |
|             | Civic     | '73         | 4 Cyl. | 86.6"  | 1536# | FWD E BN       |
|             | Civic     | '74         |        |        | 1605# | See Above      |
|             | Civic     | '75         |        |        | 1748# | "              |
|             | Accord    | '76         | 4 Cyl. | 93.7"  | 1993# | "              |
| Jaguar      | XKE       | '71         | 6 Cyl. | 96"    | 2570# | C E BE P       |
| Jensen      | Healy     | '74         |        | 92"    | 2116# | E P            |
| LUV         | (Chev)    | '73         | 4 Cyl. | 102.5" | 2450# | C IE B HD      |
| MG          | Midget    | '71         | 4 Cyl. | 80"    | 1512# | C E B BE       |
|             | MGB       | '71         | 4 Cyl. | 91"    | 1920# | C E B BE       |
|             | Midget    | '74         |        |        | 1746# | See Above      |
|             | MGB       | '74         |        |        | 2394# | "              |
| Suburu      | Star      | '71         | 4 Cyl. | 95.2"  | 1420# | FWD P B        |
|             | DL        | '73         | 4 Cyl. | 96.6"  | 1840# | FWD IE B       |
|             | GL        | '73         | 4 Cyl. |        | 1860# | FWD IE B       |
|             | DL        | '74         |        |        | 2040# | See Above      |
|             | GL        | '74         |        |        | 2000# | "              |
| Toyota      | Corolla   | '71         | 4 Cyl. | 95.7"  | 2170# | C IE B         |
|             | Corona    | '71         | 4 Cyl. | 98.8"  | 2310# | C IE B         |
|             | Celica    | '71         | 4 Cyl. | 95.5"  | 2270# | C IE B         |
|             | Hi Lux PU | '71         | 4 Cyl. | 99.8"  | 2440# | C IE B HD      |
|             | Corolla   | '76         |        |        | 2225# | See Above      |
|             | Corona    | '76         |        |        | 2576# | "              |
|             | Celica    | '76         |        |        | 2545# | "              |
|             | Hi Lux PU | '76         |        |        | 2455# | "              |
| Triumph     | Spitfire  | '71         | 4 Cyl. | 83"    | 1708# | C E B BE P     |
|             | TR6       | '71         | 4 Cyl. | 100"   | 2156# | C E B BE P     |
| VW          | Sedan     | '71         | 4 Cyl. | 95.3"  | 1786# | RD E B         |
|             | Kar. Ghia | '71         | 4 Cyl. | 94.5"  | 1874# | RD E B         |
|             | Fastback  | '71         | 4 Cyl. | 94.5"  | 2117# | RD E B         |
|             | Sq. Back  | '71         | 4 Cyl. | 94.5"  | 2161# | RD E B         |
|             | Type IV   | '71         | 4 Cyl. | 98.3"  | 2315# | RD E B         |
|             | Tr. Pnl.  | '71         | 4 Cyl. | 94.5"  | 2491# | RD E B         |
|             | Sedan     | '75         |        |        | 1896# | RD E B         |
|             | Rabbit    | '75         | 4 Cyl. | 94.5"  | 1830# | FWD E BN       |
|             | Dasher    | '75         | 4 Cyl. | 97.2"  | 2068# | FWD E BN       |
|             | Scirocco  | '75         | 4 Cyl. | 94.5"  | 1950# | FWD E BN       |

```
G- Conventional front engine rear drive
FWD- Front Wheel Drive
RD- Rear engine, rear drive
IE- Inexpensive vehicle
E- Expensive vehicle
B- Engines tend to blow
```

BN- Engines tend not to blow  
BR- Vehicle has a bad reputation  
BE- Vehicle has poor engineering  
HE- Heavy engine-over 500#  
HD- Heavy Duty vehicle  
P- Parts availability problem



## EV Marketplace

FOR SALE: BRADLEY GT 11 Electric. Built by Miller. 1040 miles as of 4/17/84. Wt. 1380 lbs, top speed 70 MPH, range 40-75 miles. Motor-Prestolite 20 HP/4900 RPM, 96 VDC/200 AMPs. Controller-transistor chopper by EVI, 72-96 VDC/320 AMPs. One 12-volt and 16 6-volt batteries. White, red interior, many extras. Asking 22K. Bob Steward, 2152 Fuller, Colo. Spgs., CO 80918

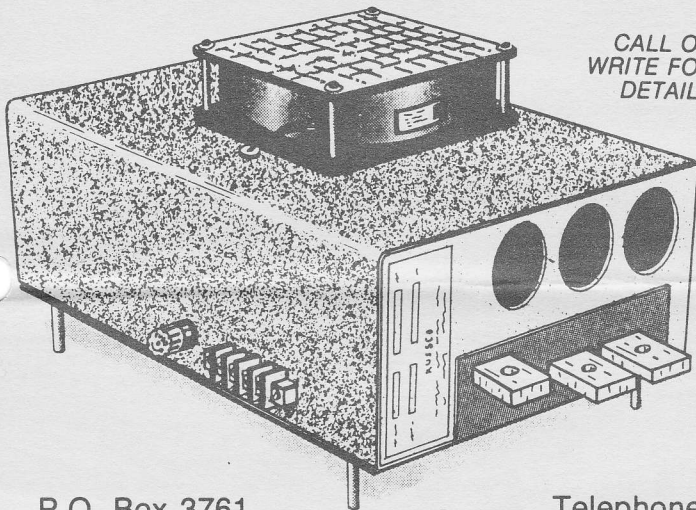
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### ELECTRIC VEHICLE CONTROLLER

**\$495**

- 400 AMP
- 24-120 VOLT
- FULLY PROTECTED

CALL OR  
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DETAILS



P.O. Box 3761  
Santa Rosa, CA 95402

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(707) 542-4151

**RUSSCO**   
**ELECTRO-MECHANICAL ENGINEERING**

Liquidation of 35 Electric Mopeds  
Reasonable offer-- Dick Peak (408) 926-5714  
or John Alesandro (408) 926-5714

\*\*\*\*\*

FOR SALE: PMC controller 96v-350A \$500:  
PMC controller 96v-400A \$550: EVC Inc.  
controller 12-96v 500A new \$300: HB Elec.  
controller SCR 48-96v-450A \$150: GE motor  
21HP series \$400: HB contactor 12v coil  
500A contacts \$25: Meters & shunts from  
\$5: 96v. Lester charger \$150: Roger (619)  
453-2231 or 277-3166

\*\*\*\*\*

FOR SALE: '72 VW FASTBACK; Gas tank and engine removed. Ready for conversion. Good condition \$500.

CUSTOM ELECTRIC TRIKE: VW transaxle and motorcycle front end, 8 step speed control. Has 4 of 8 Diehard EV-Marine batteries. 20 HP shunt field aircraft motor, needs body. \$600. James 408-946-2944 after 7p.m.

\*\*\*\*\*

FOR SALE: '73 Subaru front wheel drive with clutch and 4 speed trans. Compound wound jet engine starter. runs good needs throttle control \$1250. Extra motor and adpt. for VW Bug, silver plated switches and batteries. Sell all or part \$600. A. Stanley (707) 226-6337

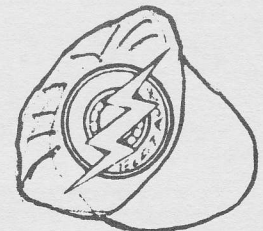
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FOR SALE: '80 Bradley GT factory assembly. Needs batteries and some work \$3000 (408)268-0822 Pat Owens, 6403 Tamalpais Ave. San Jose 95120

FOR SALE: New & Used EV'S. Omni 024 Escort, Jet minivan, Honda Civic, 72V-\$3,200. Prestolite Motors, Adaptor Plates, Controllers, Call Stan (415) 964-3974



HELP !!



EAA BASEBALL CAP  
\$25 "RALLY" DONATION  
787 Florales Dr.  
Palo Alto, CA 94306

# WHATS HAP'N

## Peninsula

June 2

San Bruno Library 10 to 12 noon meeting of Peninsula chapter. **SPEAKER** Mr. Bruce Marshall his subject is, "Land fill gas recovery, and utilization". He will tell us all about, and show us slides of this process. Come and bring a friend.

July 7, 12 noon.

Members of Peninsula Chapter will have their annual pot luck picnic at Coyote Point. Save this date for **FOOD-FUN-and LOTS OF VISITING WITH FRIENDS.**

## EAST BAY

JUNE 9th SOUTHLAND MALL EV EXPO

AUG. 11th OAKLAND RALLY

OCT. 13th SOUTHSORE ALEMEDA EV EXPO

# Rally

CALL CHUCK HUNTLEY  
After 6: (415) 431-8179

## DENVER

## DEVC

June 8,9,10

SHOW DEVC Lakewood Mall Electric Vehicle Show. Call George Gless (303) 442-6566.

## TWELFTH ANNUAL

# INTERNATIONAL Rally

8&9th SEPTEMBER SYMPOSIUM 1984

## SEATTLE Electric Car Rally JULY 29

CALL STEVEN LOUGH (206)325-2600

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



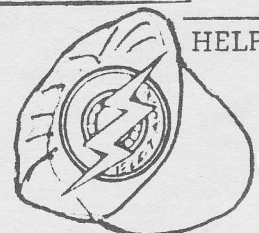
Association

# NEWS

JUNE 1984

1249 Lane St.  
Belmont, Ca.  
94002

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