

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER D-44  
Relating to Exemptions under Section 27156  
of the Vehicle Code

FAIRCHILD SEMICONDUCTOR  
"KV ELECTRONIC IGNITION SYSTEM MODEL E 100"

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Section 39023 of the Health and Safety Code;

IT IS ORDERED AND RESOLVED: That the installation of "KV Electronic Ignition System Model E 100" device manufactured and marketed by Fairchild Semiconductor of 464 Ellis Street, Mountain View, California 94040, has been found to not reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1974 and older model-year vehicles with 12-volt battery, standard ignition coil, contact set, and negative ground. This exemption does not include those vehicles originally equipped with breakerless or electronic ignition system.

The electrical circuit of the device consists of two transistors and four resistors enclosed in an aluminum housing.

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different than those listed by the vehicle manufacturer.

Changes made to the design or operating conditions of the device as originally submitted to the Air Resources Board for evaluation that adversely affect the performance of the vehicle's pollution control devices shall invalidate this Executive Order.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board.

This Executive Order does not constitute any opinions as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE "KV ELECTRONIC IGNITION SYSTEM MODEL E 100" DEVICE.

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Section 17500 of the Business and Professions Code makes unlawful, untrue or misleading advertising, and Section 17534 makes violation punishable as a misdemeanor.

Sections 39130 and 39184 of the Health and Safety Code provide as follows:

"39130. No person shall install, sell, offer for sale, or advertise, or, except in an application to the board for certification of a device, represent, any device as a motor vehicle pollution control device unless that device has been certified by the board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this section is a misdemeanor."

"39184. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the board for accreditation of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been accredited by the board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as an accredited device which, in fact, is not an accredited device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at Sacramento, California, this 21 day of November, 1974.

WILLIAM SIMMONS  
Executive Officer

State of California

AIR RESOURCES BOARD

November 8, 1974

Staff Report

Evaluation of the Fairchild Semiconductor  
"K.V. Electronic Ignition System Model E 100" for Compliance  
with the Requirements of Section 27156 of the California  
Motor Vehicle Code

I. Introduction

Fairchild Semiconductor of 464 Ellis Street, Mountain View, California 94040 has submitted an application requesting an exemption from the prohibitions of Section 27156 of the California Vehicle Code for the "KV Electronic Ignition System Model E 100". Vehicle Code Section 27156 prohibits the sale, advertisement, and installation of any device or mechanism which adversely affect performance of the emission control system. The applicant is requesting the exemption be granted for all 1974 and older model-year vehicles equipped with a conventional ignition system.

II. System Description and Function

The "KV Electronic Ignition System" is an aftermarket ignition device which is installed in the engine's electrical system. The device consists of an electronic circuit enclosed in a cast aluminum housing. The circuit consists of two transistors and four resistors (See Exhibit A for schematic device). Four external leads from this device are color coded to assure the correct connection (See Exhibit B for installation instructions).

### III. Device Evaluation

The purpose of this device is to prevent point arcing. This problem is more prevalent at the lower speeds (i.e. idle and cranking speed) due to the longer time required for the points to open. In order to resolve this problem, the point current flow is reduced to 0.1 amperes with the device as compared to 2 to 4 amperes occurring in the stock system. According to the applicant, the reduce current flow will help prolong point contact life and increase spark plug life.

In the operation of the device, the opening of the points sends a signal to the transistor. Upon receiving the point signal, the transistor stops the current flow to the primary system of the coil. The use of transistors as switches provides faster cutoff of the current flow in the primary system. Therefore, higher available secondary voltages output will occur.

### III. System Evaluation

The applicant submitted data (Figure 1) comparing the electrical output of the "KV" device and the stock system. The available secondary voltages off idle is essentially the same. However, higher secondary voltages are encountered at idle and cranking speeds. No noticeable changes to the spark timing occurs with the device. The applicant presented data which show a 20 microsecond delay between the time the points open and the signal propagation from the transistor. This delay resulted in a retarded timing of 0.36 degrees at 3000 rpm. This retard is generally not measurable with common instruments.

The Air Resources Board staff conducted testing to measure the output of this device. The vehicle chosen has the following description:

Make and Model Year	1974 Ambassador Station Wagon
Engine	360 Cubic Inch Displacement
Transmission	Automatic
Carburetor	Two Barrel
Emission Control	Exhaust Gas Recirculation and Air Injection

The following tables summarize the data:

Centrifugal Spark Advance from Top Dead Center  
(Crankshaft Degree)

<u>Crankshaft rpm</u>	<u>Baseline</u>	<u>Device</u>
idle	0	0
1000	5	5
1500	12.5	12.5
2000	16	16
2500	18	18
3000	21	21

Spark Duration (Milliseconds)

<u>Crankshaft rpm</u>	<u>Baseline</u>	<u>Device</u>
idle	1.40	1.40
1200	1.32	1.32
2000	1.18	1.18

Available Secondary Voltages

<u>Crankshaft rpm</u>	<u>Baseline</u>	<u>Device</u>
idle	20	32
1200	26	32
2200	23	30

Idle Exhaust Emission

<u>Baseline Ignition</u>		<u>Device</u>	
<u>HC (ppm)</u>	<u>CO (%)</u>	<u>HC (ppm)</u>	<u>CO %</u>
90	1%	85	1%

Before testing, the vehicles ignition and engine settings were checked and adjusted to original equipment manufacturer's specifications. Generally the above results indicate no change in the electrical output characteristics with and without the device although higher secondary voltages were noted with the device at the higher speeds.

One explanation for the differences between the applicant's and ARB secondary voltage data off idle may be due to the conditions of the points. Points that accumulated mileage generally exhibit a greater tendency to arc. The points used by the applicant were new while the points used by the ARB had accumulated 6000 miles. Therefore, the elimination of arching caused by the device would be expected to increase the secondary voltages observed in the ARB test results.

One potential problem that might occur with ignition system such as the "KV" device which reduces the point current flow is the allowing of residual deposit formation such as crankcase vapors on the points. If these deposits are significant, intermittent or complete cessation of the point current flow would occur and lead to conditions of engine misfiring or stalling. This problem does not occur in conventional ignition system because the deposits are burned away by point arching.

IV. Conclusion and Recommendation

Based on the results of our tests, the staff is of the opinion this device would not have any adverse effect on the emission control system. Therefore the staff recommends that Fairchild Semiconductor be issued an exemption from the provisions of Section 27156 for the "KV Electronic Ignition System Model E 100" for all 1974 and older model-year vehicles except those vehicles originally equipped with a breakerless or electronic ignition system.

9-12-74

secondary

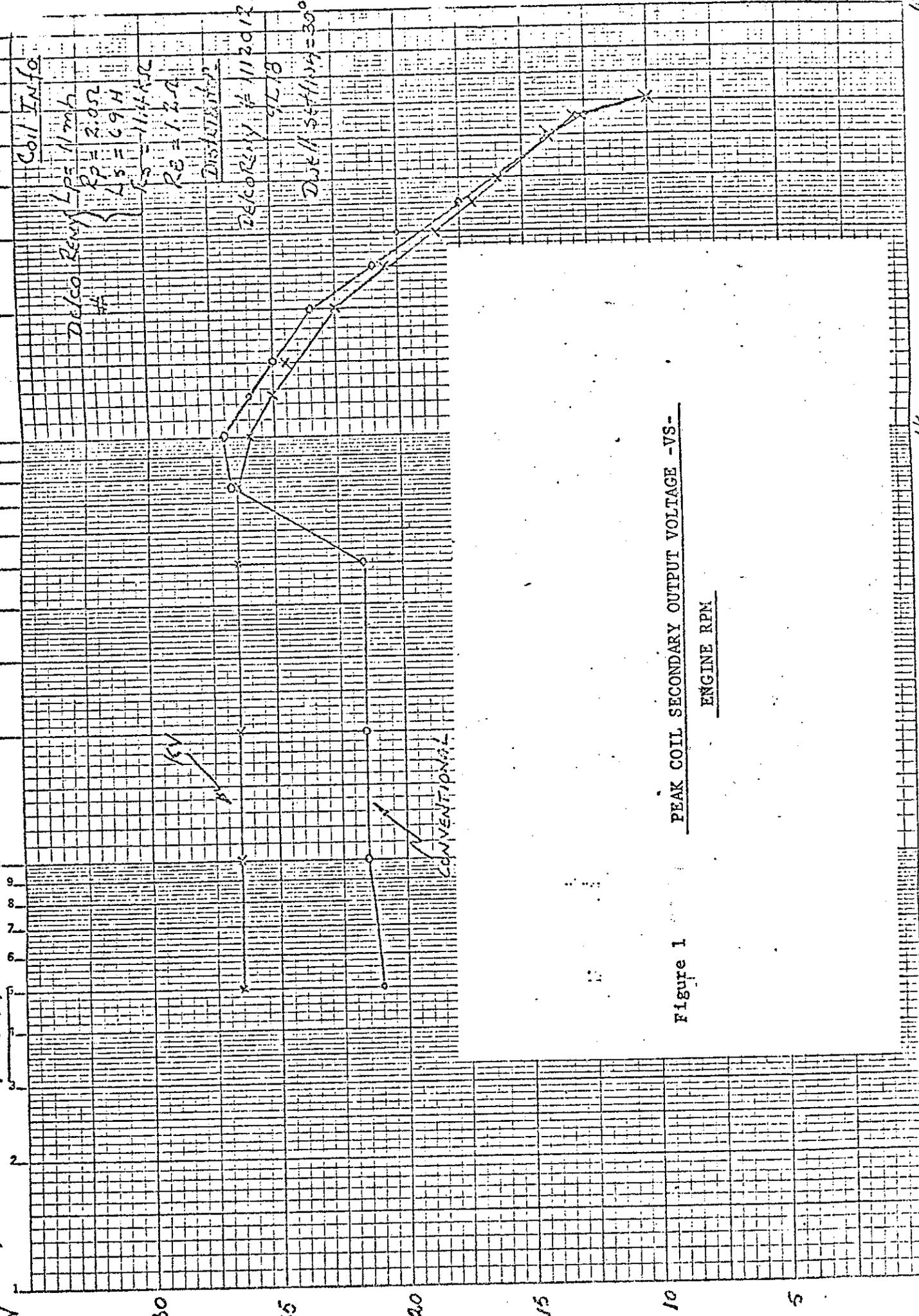


Figure 1 PEAK COIL SECONDARY OUTPUT VOLTAGE -VS- ENGINE RPM

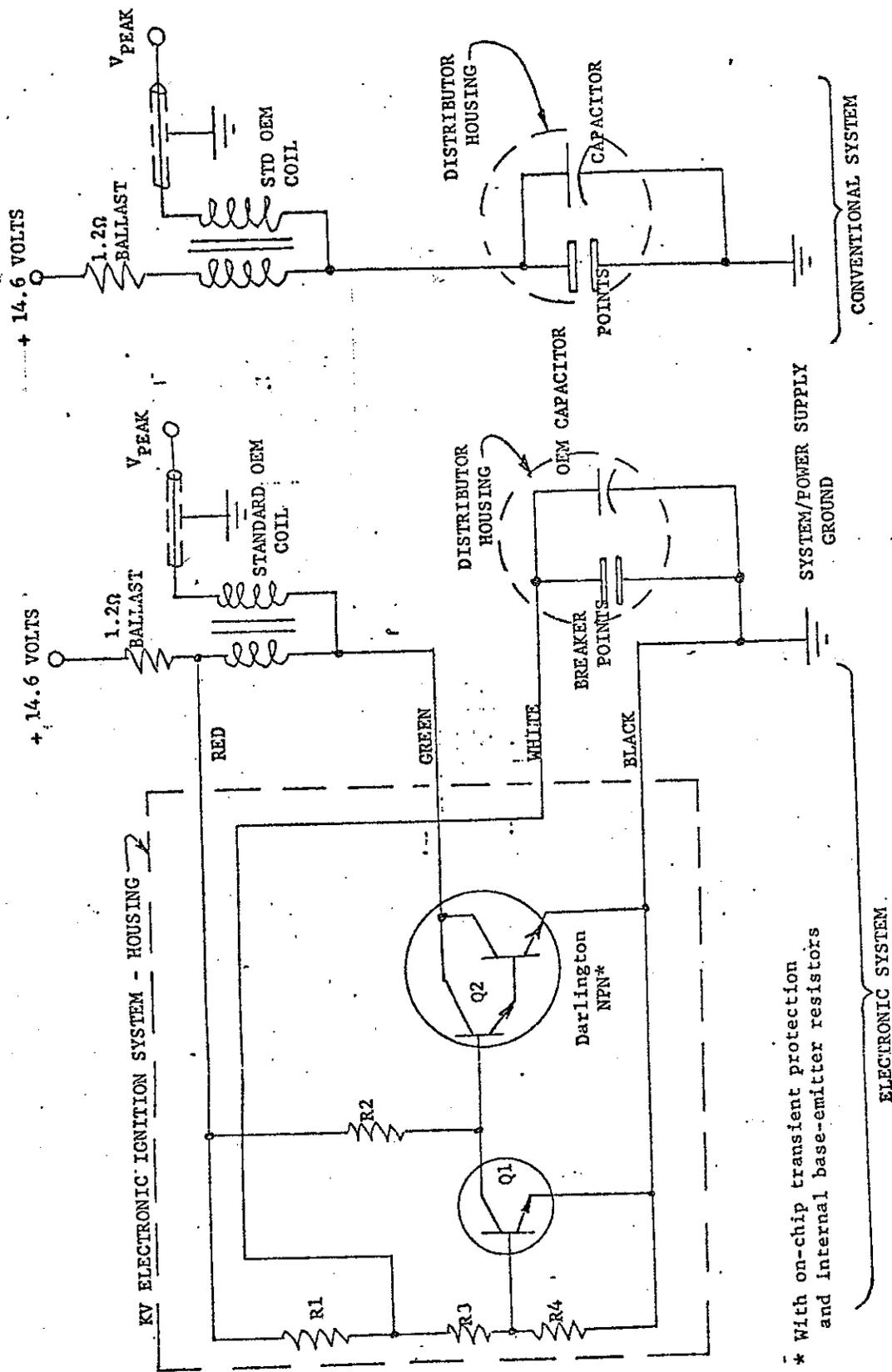


Exhibit A SYSTEM TEST CONNECTION AND SCHEMATIC DIAGRAM

Exhibit B

MODEL E-100 INSTALLATION INSTRUCTIONS

The Model E-100 is easily installed and no special tools are required. Figure 3 shows the connection diagram. The module may be mounted away from under the hood heat sources on the fender, fire-wall, splash panel or any convenient place, other than the engine block. The four wires should be connected up as follows:

Red	to	battery side of coil
Green	to	distributor side of coil
White	to	coil side of points
Black	to	ground

Since the prime function of the Model E-100 is to preserve tune-up conditions by lengthening point life, the best value can be obtained by installing new points and plugs at the same time. The system should be retuned and will then maintain top performance for considerably longer than when a conventional system is used.

At installation time, an inspection of the ignition system high voltage components (coil, distributor cap and spark plug leads) should be conducted. Worn parts should be replaced in the interest of improved performance and reliability - together with maintaining acceptable emissions levels.

After installation, ignition timing and breaker point gap ( or dwell ) should be set according to the car owner's manual specifications. After this, the timing should be checked at the recommended tune-up intervals. If the timing subsequently changes, the breaker point gap should be readjusted and the timing reset. A small quantity of the type lubricant supplied with new breaker points should also be wiped on the distributor cam.

Exhibit B (cont.)

CONNECTION DIAGRAM

