Model A Ford
6-volt to 12-volt Power Conversion
For Cell Phones & GPS

by Tom Endy

In 2009 I purchased a 6 to 12 volt power inverter from Bratton's Antique Auto to install in my positive ground 6-volt Model A Ford Victoria. The price was about $100. The reason was there was a need to be able to power a GPS while on a tour and to recharge the battery in my cell phone. This required a 12-volt negative ground power source.

What I wanted was a unit that was mostly out of sight, could be easily switched on and off, had a pilot light indicator that told me when unit was turned on, and had an easy means for plugging in either a GPS or a cell phone.

To satisfy this criterion I decided the best place to locate such a unit was under the dash rail on the right side of the car. There is ample room under there for the installation and it would provide easy access for an off\on switch, I would be able to see the pilot light, and it would allow for an easy plug-in for a GPS or a cell phone at the extreme right side of the car.

The cost of the inverter was the biggest cost item. The other items needed were inexpensive and easily procured locally. The metal bracket material was purchased from Home Depot. The cigarette lighter style power outlet was purchased from a local auto parts store. Those made by Bell Automotive Products appeared to be the better choice. The power switch, pilot light, terminal strip, and the wiring were purchased from a local electronics store. The 7.5 amp fuse seen in the assembly came with the inverter from Bratton's.

The rest of the effort was all labor, and it is time consuming. There are existing bolts under the dash rail that can be utilized, so there is no need to drill any holes in the Model A. The existing bolts will have to be replaced with longer ones.

The inverter does not come with a wiring diagram, so what goes on inside the metal can is a mystery. There are only three wires associated with the inverter. One wire is the negative 6-volt input, another is the positive 12-volt output, and the third wire is a common ground for both voltages. I am unable to understand how they were able to design a power source that has two different voltages, one negative and one positive, and with both referenced to a common ground. However, they were somehow able to achieve it.

When the unit was complete and installed in the car it worked flawlessly. I wrote an article about it that has appeared in a number of Model A Ford Club newsletters. The original article appears here on page 2. It is also posted on the web site of the Orange County Model A Ford Club of Southern California (ocmafc.com) and has been picked up by clubs throughout the country. Quite often I receive calls from people asking specific question about the construction and I am not always able to remember exactly what I did to construct the unit.

Bratton's also contacted me early on and contracted with me to build them a unit to evaluate as a possible marketing venture. The project proved to not be cost affect to market.

With all the interest in this device I thought it prudent to research all my notes and put all into one document. This is the reason for this article. It is available to anyone who wants to use it.

A Power Inverter!

by Tom Endy

6-volt positive ground:

The Model A Ford was designed and built with a six-volt positive ground electrical system. It has for many years served the car well and will continue to do so. However, many Model A owners have converted to a 12-volt negative ground system for various reasons. This is a matter of personal choice. To make the conversion one must replace the battery, the generator (or alternator), the ignition coil, and all the light bulbs. A dropping resister will be needed for the ahooguh horn, and it would be prudent to change the starter to a 12-volt version, however, a six-volt starter will work on 12-volts.

Personal thoughts:

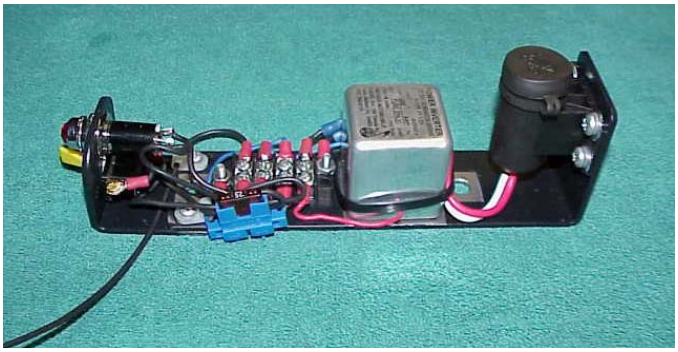
If I were starting from ground zero with a Model A restoration I would definitely convert it to 12-volts. Since I would have to buy a battery, alternator, ignition coil, starter, and all the light bulbs, the cost would be about the same regardless of which I chose, 6 or 12 volt. The advantage of the 12-volt would be that I could recharge my cell phone and operate a portable GPS system while on a tour. I would also be able to replace a failed alternator on a tour by going to most any auto parts store. It would be difficult to obtain a 6-volt positive ground alternator while on a tour.

An alternative:

My Victoria already has a 6-volt positive ground electrical system and because I did not want to go to the expense of converting it, I found an alternative solution. Bratton sells a device called an inverter that will provide a low power 12-volt negative ground voltage from a 6-volt positive ground system that is capable of operating a cell phone, and a GPS. Bratton actually stocks two types. One has a 1.2 amp output that will support a cell phone or GPS ($70); the other has a 2.5 amp output that will support a radio or tape player ($100). I selected the 2.5 amp unit. The inverter is very small, just one and three quarter inches square. It uses a common ground for both input and output. The unit is grounded to the chassis and there is one lead for a negative 6-volt input, and one lead for a positive 12-volt output.

The installation:

A power outlet of the “cigarette lighter” type was obtained from an auto supply store. The inverter and the power outlet were attached to a homemade bracket that fits up under the dash rail on the passenger side of the car. It mounts to two existing bolts five inches apart. An off-on switch controls the inverter and a power on lamp was included to indicate power on. Both the inverter and the power outlet are pretty much out of sight. I now have the ability to power my GPS and recharge my cell phone while rolling down the road in my 6-volt positive ground Vic.



The complete assembly is shown above. The inverter is the square looking device in the center. The power outlet is to the right. The power outlet points straight down when installed under the dash rail. A single wire runs from the terminal strip to the negative 6-volt battery voltage. The power switch and the indicator lamp are to the left. The entire assembly is grounded by virtue of mounting it under the dash rail.

Shown above is the entire assembly installed under the dash rail on the right side of the car and ready for use. ☺

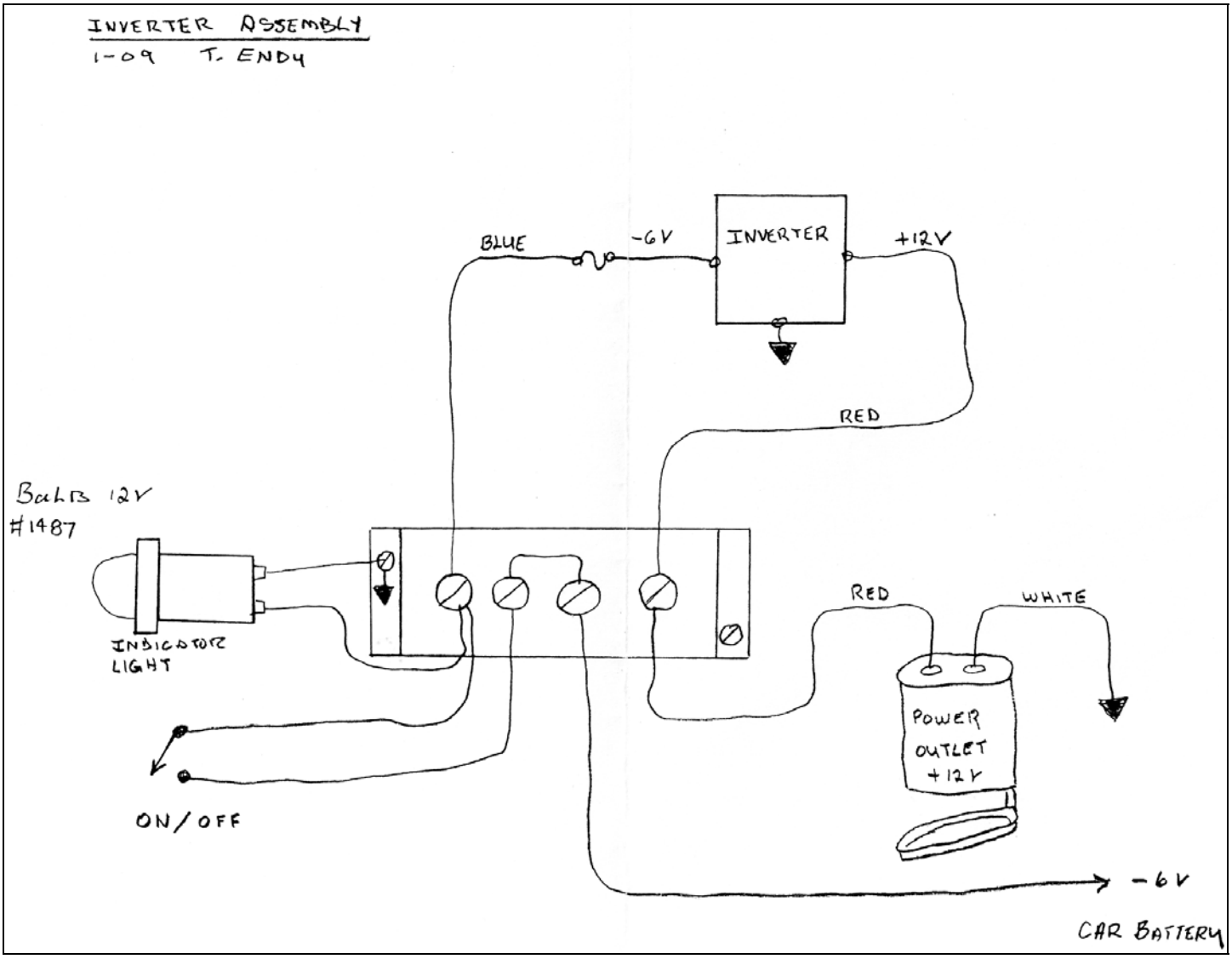
Electrical Diagram

Note:

A 12-volt pilot lamp #1487 is used on the 6-volt input side because a six-volt bulb will prematurely burn out because of the higher generator voltage.

The fuse in the circuit came with the inverter. The value is 7.5 amps.

Negative 6-volt power input is obtained from either of the two terminal lugs on the firewall.



Top View of Assembly

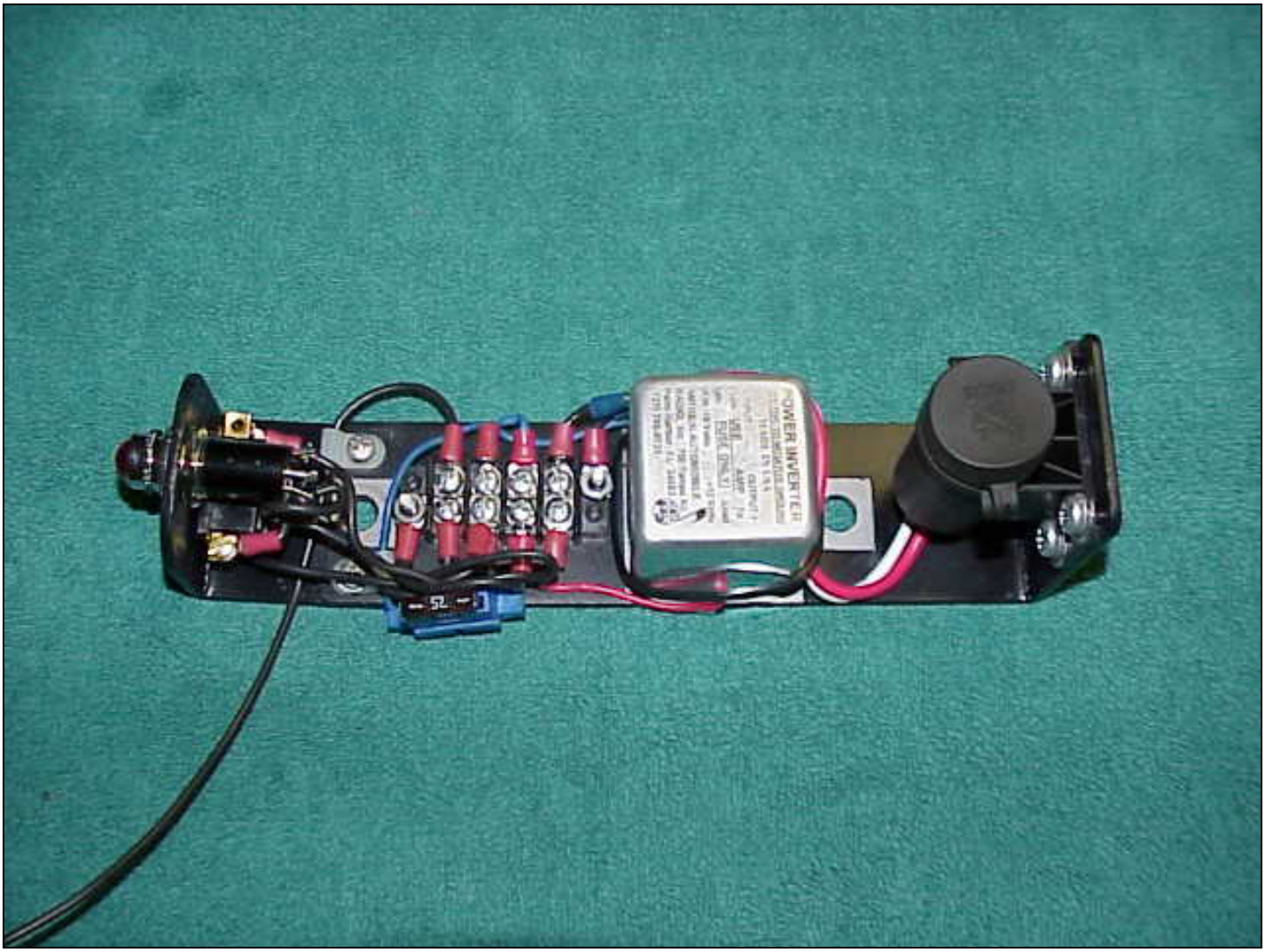
Note:

This was the original unit I built and is installed in my Victoria. The bracket is a one-piece unit. I later determined that the "L" shape at the right end should be a separate piece with the ability for it to slide in slotted holes to better fit against the right end under the dash rail.

The wire on the lower left runs off to negative 6-volt input power. The ideal connection point is one of the two terminal lugs on the firewall.

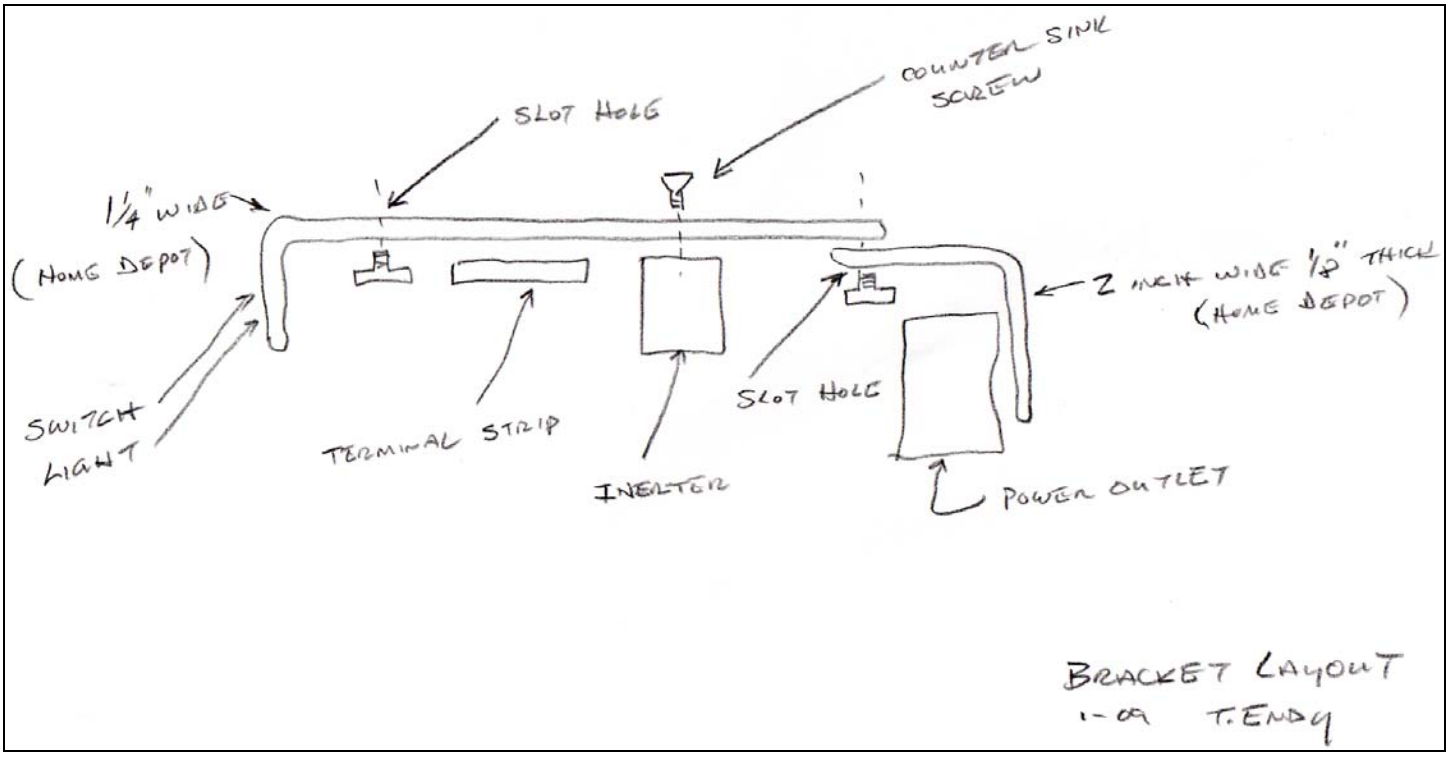
The two mounting holes are shown at each end and were masked off to remain unpainted for grounding purposes. The holes line up with existing holes under the dash rail on the right side.

The on\off switch is mounted directly below the pilot light at the left end of the bracket.



Exploded View Layout

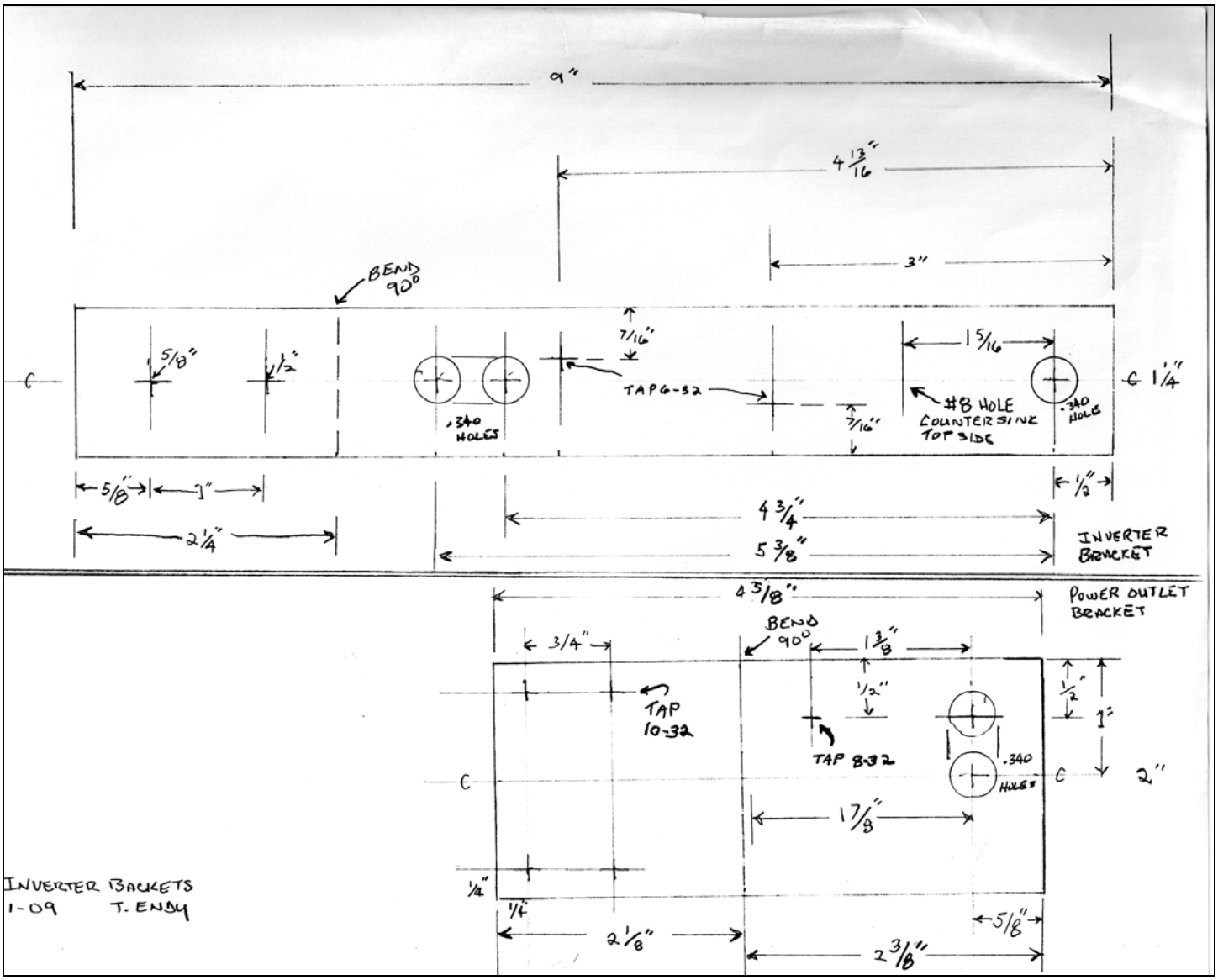
Note:
This is an exploded view of the second unit I built for Bratton's with the two piece and narrower brackets.



Mechanical layout of the Brackets

Note:

This is the drawing of the bracket assemblies used for the production of the single unit that was produced for Bratton's Antique Auto at their request. The sample and a copy of this drawing were sent to them. They decided not to produce and market them as the manufacture is too labor intense and would not be cost affective.



Notes Recorded When I Built a Second Unit

When I built the original unit for my 31 Victoria I used a .125-inch thick, two-inch wide material for the mounting bracket. When I went to Home Depot to buy more material to build another unit I inadvertently bought .180 thick stock. Not only is it difficult to work with, it is much thicker than need be. I spent way more time fabricating the bracket than need be. I also shaped the bracket slightly different than the original. I made the portion that fits up under the dash rail narrower. This way I did not have to offset the two mounting holes, and it should be able to fit under the 28-29 dash rail, which is not as wide as the 30-31 cars.

I am of the opinion that the bracket should be made in two pieces. A two-inch wide angle bracket should be fabricated to mount the power outlet on. This would attach to a one and a quarter inch bracket that would have an L-shape at the opposite end to mount the switch and indicator light. It would also mount the inverter and the terminal block. I also slotted the holes in both brackets; this will accommodate better adjustment in different models. I am not certain what the measurements are on other Model A's.

I did try to fit the unit on a 31 roadster. My observation is that it does fit, but does not look very good on a roadster. The vertical part of the dash rail does not come down as far as on sedans and coupes and is not enough to hide the assembly. For this application I would mount the power outlet on the single two-inch bracket, and mount it in the right corner and put the switch and indicator light on another bracket and mount it in the left corner, then put the inverter elsewhere.

It is imperative that an indicator light be included so someone will not leave the inverter powered inadvertently and run the car battery down. There are backlighted switches available from auto parts store, but they are all rated at 12 volts. An incandescent 12 volt bulb will work on 6 volts well enough, but I think those being offered are LED's, and they may not work on 6 volts. If they did, it would be the way to go. One thing I learned from my installation is that a 6-volt bulb will not hold up. They burn out in about 3 hours. I think they are designed for flashlights and the generator voltage may get up to above 8 volts and it will burn the bulb out. I am using a 12-volt bulb now and it seems to work and is bright enough.

The power outlet I am using was obtained from Kragen Auto Parts. They are actually manufactured by Bell Automotive Products. They appear to be the best for this application. They retail for about $11.

I put a lug on the end of the power input lead that will fit either terminal of the box on the firewall and it is long enough to reach it. To install the unit in the car it need only to be attached to the two bolts under the dash rail on the right side of the car. This will provide sufficient ground for the unit. The length of wire is then routed down through the left kick panel, across the top of the firewall and out through the tunnel the speedometer cable and the pop-out cable go through. The lug is attached to either terminal on the firewall box. Either side will work, but if attached to the left terminal it will show on the ammeter when the unit is powered.

Parts list:

Mounting bracket
Power outlet
On\off switch
Indicator light\12-volt bulb
Terminal strip, 4-position
Terminal lugs\Wire
10-32 screws (4)
6-32 screws (2)
8-32 screws (1)
Cable clamp (1)