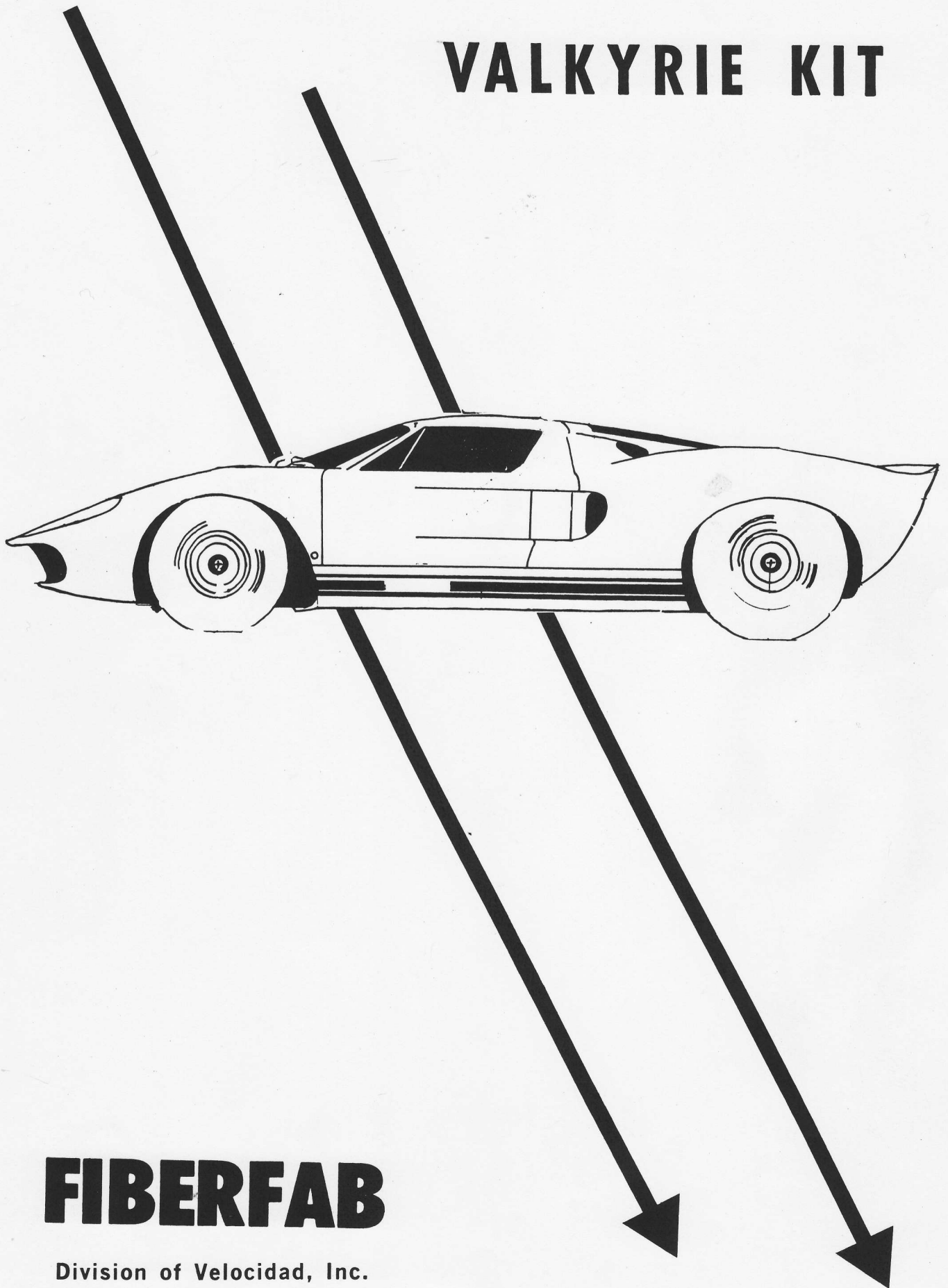


VALKYRIE KIT



FIBERFAB

Division of Velocidad, Inc.

VALKYRIE KIT CONSTRUCTION MANUAL

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- 3/ ACQUIRING COMPONENTS
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PARTS LIST
OPTIONS LIST

1/ INTRODUCTION TO THE VALKYRIE KIT

Fiberfab first introduced the Valkyrie concept to the public in the fall of 1966 in the form of the VALKYRIE 500 GT automobile. The 500 GT is a completely finished vehicle incorporating a centrally-located, 500 horsepower engine, a five speed Z-F transaxle, four-wheel independent suspension and disc brakes, "topped off" with a posh, all-leather interior and a sleek, ultra-contemporary GT body. The 500 GT is undoubtedly the fastest production automobile ever made available to the general public -- it is also one of the most beautiful. The price of the GT 500 is \$12,500.

\$12,500 for a car such as the 500 GT cannot be considered unreasonable, especially when a comparison is made between this price and the prices of similar vehicles (eg., the FORD GT-40 at \$17,700, etc.). Regardless of the rationale for this price, it remains, however, beyond the budgets of all but the most avid car buffs.

It is realized, by Fiberfab's technical staff, that much of the cost of the Valkyrie 500 resides in labor expenditures and the costs of the specially-prepared engine and gearbox -- eliminate these high-cost items and the price of the Valkyrie is significantly reduced. The low price of the VALKYRIE KIT -- \$1495 -- is accomplished in this manner, ie., by trading Fiberfab's personnel and overhead charges for your time and by making provisions in the kit design for the use of standard automotive components supplied by you.

Whereas the 500 GT is a completed; and as a result expensive; machine, the VALKYRIE KIT is completed by you at the expense of your time and for the cost of the kit and standard, readily available engine, running-gear and suspension components. In particular, the VALKYRIE KIT includes the following:

1. Special rectangular-tube frame (5" x 2" x .083", 3" x 1-1/2" x .083" and 2" x 2" x .083" steel tubing with 1/8" steel-plate gusset reinforcements).
2. The VALKYRIE body complete with console dash, integral floorpan with molded-in seats, and wheel-well inner-panels.
3. Windshield and rear-window glass.
4. Special adapter components which allow you to utilize the Chevrolet 283/327 cubic-inch engine* and Chevrolet Corvair transaxles and rear suspension (post 1964) and Corvair front suspensions.

* Ford 289 CID engines may be used in special-order kits.

1/ INTRODUCTION TO THE VALKYRIE KIT - CONTINUED

Hence, you provide only your time and creativity and about \$450 (average) of major automotive suspension and power components in excess of the purchase price of the Valkyrie Kit.

Figure 1 shows an overall view of all the components in the Valkyrie kit and Figure 2 shows, in detail, just the components of the Corvair-to-V8 adapter kit which comes with the Valkyrie. (It is interesting to note in Figure 2, the differences in length and diameter between the Corvair standard transmission input shaft 25" long and the special Fiberfab shaft shown. By eliminating the need for the long, flexible standard shaft, Fiberfab's adaptation of the Corvair transaxle is capable of handling significantly more torque than the original Corvair configuration.-- from 265 lb-ft maximum for standard Corvair up to 375 lb-ft for the Fiberfab Valkyrie set-up).

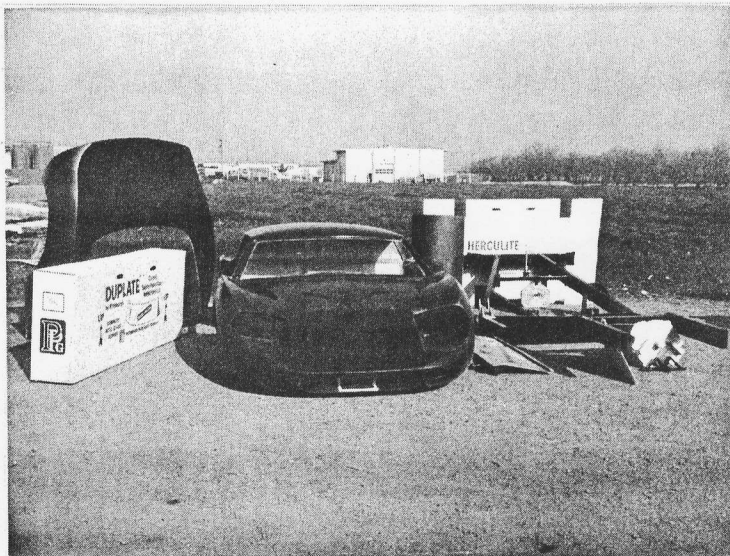


FIGURE 1

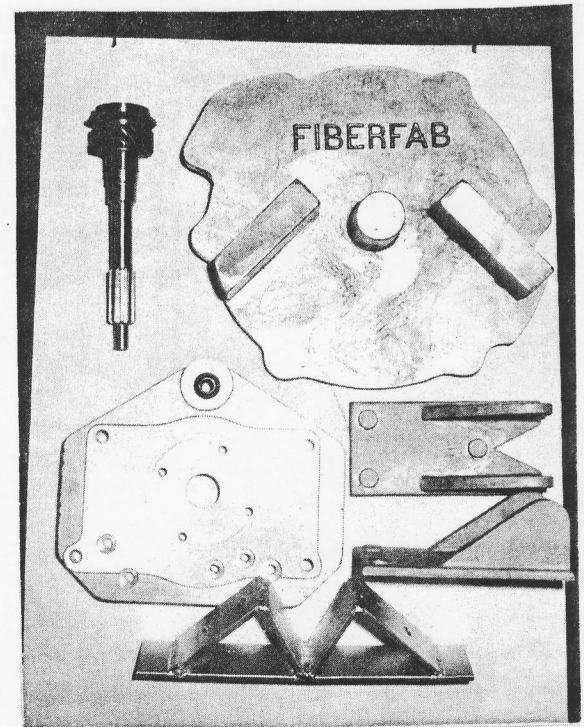


FIGURE 2

2/... CONSTRUCTION MATERIALS

The typical inventory of tools found in most home workshops will probably suffice to complete your Valkyrie Kit. A foremost criterion in all Fiberfab designs is that assembly procedures should not be based on the use of any "exotic" cutting, fastening, etc. methods not readily available to the home, "hobby-type" builder. There are those instances, of course, when for example, arc-welding might be preferred to bolting -- in no instance, however, is an exotic technique required nor will the use of a home workshop alternative compromise the integrity of your finished Valkyrie.

The following tabulation of tools and materials is based on Fiberfab's factory assembly procedures and experience. Items considered essential are listed apart from those items that are simply helpful or time-saving (but whose function can be duplicated by the essential items).

HAND TOOLS

Essential

3/8" - drive sockets: 5/16", 3/8", 7/16", 1/2", 9/16", 5/8", 11/16", 3/4"
3/8" - drive ratchet-handle
Combination wrenches (open-end and box-end combined): 3/8", 7/16", 1/2", 9/16", 5/8"
Standard screwdriver: medium blade
Phillips screwdriver: medium blade
Straight-edge
Drills (high-speed steel): 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2"
Files: 1/4" diameter round-file, flat wood rasp
Taps: 1/4"-20, 5/16" -18
Misc: hacksaw, center-punch, knife, hammer, putty-knife

Helpful

3/8" - drive extensions: 3" and 6"
"Pop-rivet" gun -- home workshop variety (\$4.95)
72" steel rule
Electrical terminal crimping tool and wire-stripper -- home workshop variety (\$2.98)
Set of wood-working (high-speed steel not required) hole saws, eg., 1/2", 1", 2", 3"
Diagonal-cutting-pliers
"Channel-lock" pliers
Jack stands

POWER TOOLS

Essential

Electric drill: 1/4" capacity

Helpful

Electric drill: 1/2" capacity
Sabre saw
Rotary sander/grinder
Hydraulic floor-jack

2/ CONSTRUCTION MATERIALS - CONTINUED

CONSTRUCTION MATERIALS

Essential

Assorted machine bolts and nuts: 1/4", 5/16",
3/8", 7/16"

Assorted washers and locking-washers

Sandpaper: assorted coarse and fine grits

#16 AWG wire: 300 feet

#10 AWG wire: 50 feet

Silicone seal: common types are Rubber Sealant
by the Macklenburg-Duncan Company of Okla-
homa City, Dow-Corning DC 750 sealant,
General Electric sealant, etc.

Paint, primer, thinner

Helpful

Epoxy adhesive kit

Epoxy putty/filler

Crimp-on wire terminals: ring-terminals and
press-on female terminals

Assorted-length "pop" rivets and backing washers

Acetone

3. ACQUIRING COMPONENTS

This section is primarily an annotated parts list of major mechanical components required to complete your Valkyrie kit. Generally there are two sources for each item, viz., a Chevrolet (or in some cases, Ford) parts depot or auto wrecking yards -- the latter represents the most economical source, by far. Arrangements can usually be made with reputable auto wreckers to supply a "package-deal" including all the parts you require along with some form of guarantee of their usable condition.

In the locale of Fiberfab -- the San Francisco Bay Area -- reputable automobile dismantlers are listed in a publication called the PARTS LOCATOR. The PARTS LOCATOR is issued monthly and contains extensive lists of all the wrecked automobiles in yards throughout Northern California. Most likely, similar publications exist in your area and would assist you significantly if you choose to utilize used parts. For your reference, the PARTS LOCATOR address is:

PARTS LOCATOR
1696 Washington Avenue
San Leandro, California 94577

The major components of interest are:

1. Corvair transaxle/rear suspension
2. V-8 engine
3. Corvair front suspension

An exact description of these component groups is given below.

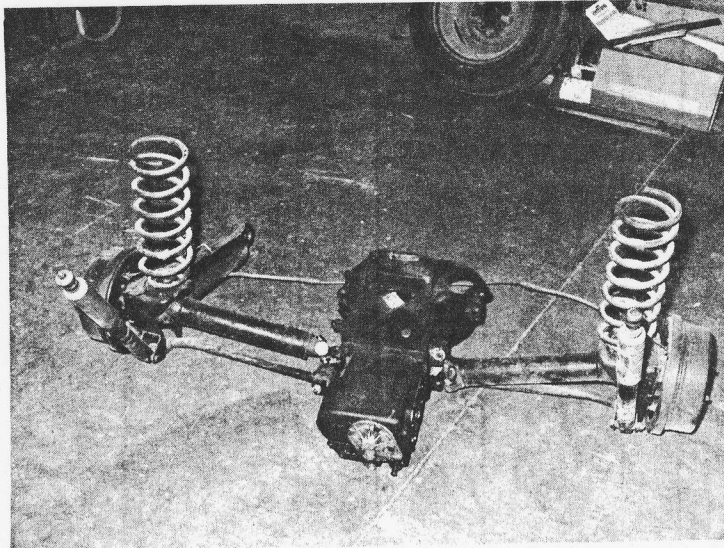
CORVAIR TRANSAXLE/REAR SUSPENSION

This component group, as used in the Valkyrie, is composed of:

1. The differential/ring and pinion housing
2. The gearbox
3. Two axles (four universal-joints)
4. Two forged-steel suspension links
5. Two stamped-steel suspension link hangers
6. Two shock absorbers
7. Two stamped-steel radius-arm/bearing carriers/hub assemblies
8. Two wheel/brake assemblies
9. Two coil springs

These components (as pictured in Figure 3) comprise the total 1965 Corvair transaxle/rear suspension unit -- less bell-housing and engine cradles. The 1966-67 units are identical with the exception that the gearbox is bigger (1-5/8' longer) and contains "beefier" gears. (WHEN A VALKYRIE KIT ORDER IS PLACED THE YEAR OF THE CORVAIR GEARBOX TO BE USED MUST BE SPECIFIED).

3. ACQUIRING COMPONENTS - CONTINUED



If you purchase a used trans-axle/rear suspension be sure to check the rubber bushings for signs of deterioration, the axles and stamped-steel components for dents, the differential and gearbox housings for gouges and/or cracks and the shock absorbers for stiffness.

FIGURE 3

1965 Corvair Rear Suspension/Transaxle Unit

CORVAIR FRONT SUSPENSION/STEERING ASSEMBLY

The Corvair -- 1960 to present -- front suspension/steering assembly can be removed from the Corvair chassis as a complete unit simply by loosening and removing about a dozen bolts. The basic front suspension cross-member is shown in Figure 4 -- note that just four bolts retain this entire unit. To this basic structure are attached,

1. Right and left upper "A-arms"
2. Right and left lower suspension links (items 1 and 2 are stamped steel parts)
3. Two springs
4. Two shock-absorbers
5. Two forged trailing arms
6. Right and left spindles
7. Right and left hubs and bearings
8. Right and left backing-plates and brakes
9. Right and left brake drums

Up to and including 1964 the hubs and wheels have a four-bolt bolt-pattern. In 1965 the pattern was changed to five-bolt (front and rear). The 1960, '61 and 62 Corvairs have no anti-roll bars. In 1963 a 5/8" bar (#3783523) was made available as an option. All 1964's were equipped with 3/4" bars and since 1965 the anti-roll bars have been 13/16" in diameter.

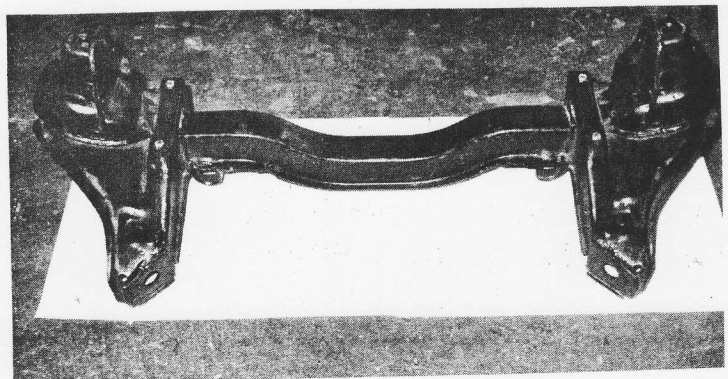


FIGURE 4 - Corvair Front Suspension

3. ACQUIRING COMPONENTS - CONTINUED

The steering assembly is composed of,

1. The steering box and shaft
2. Right and left steering arms attached to the spindles
3. Idler arm and attachment
4. Two adjustable-length drag-links (tie-rods)
5. Tie-bar

The steering assembly is removed by detaching the idler arm and steering box from the frame.

NOTE: Throughout this section we have been speaking of the Corvair steering box. Should you desire an optimum steering ratio, the Corvette Stingray steering box can be used.

If a used front suspension/steering assembly is to be used, check the rubber bushings for deterioration, the stamped parts for dents and the swivels and ball-joints for free, yet snug, operation. To verify that the suspension has not been severely "tweaked" check closely the four crossmember mounting holes -- these holes should be round, not elongated, and they should be separated by $27\frac{1}{2}$ " ($\pm 1/16$ ") from right side to left side. Also, sight across the tops of the shock absorbers, from side-to-side, to see that the crossmember is not twisted -- shock absorber tops are separated $34\frac{5}{8}$ " ($\pm 1/8$ ").

V-8 ENGINE AND BELLHOUSING

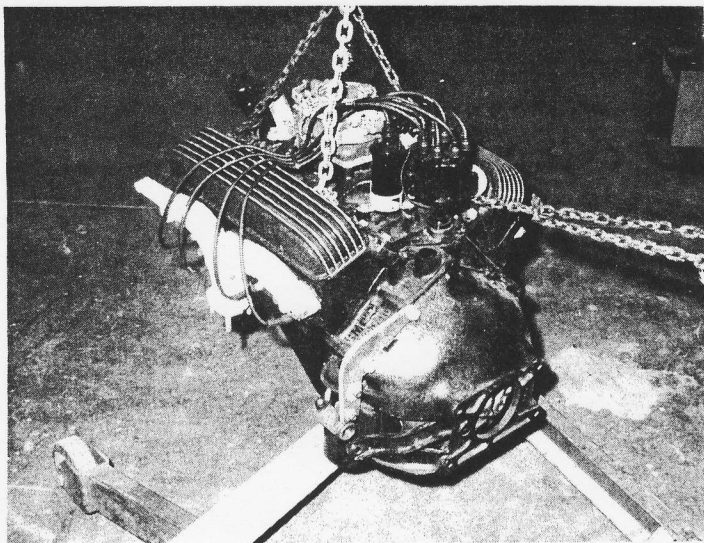
The Valkyrie Kit is designed to most readily accept a Chevrolet 283/327 cubic inch displacement (CID) engine -- or alternatively, a Ford 289 CID engine on special order. The "Chevy" engines have been available since 1957 and are quite easy to obtain from dealers, engine re-builders (in short-block form) or from wreckers. The horsepower range of the 283/327 series of engines is 185 HP to 360 HP -- the latter figure being the maximum recommended for application to the Corvair transaxle.

A typical Chevrolet 327 CID, V-8 engine, with appropriate bell-housing attached is shown in Figure 5 on the next page. (Note also the mounting of the clutch slave-cylinder). The four-bolt pattern at the rear of the bell-housing shown in Figure 5 is the only pattern suitable for use with the Fiberfab adapter plates -- both Chevrolet cast-iron and die-cast aluminum bell-housings have this pattern.

3. ACQUIRING COMPONENTS - CONTINUED

If purchase of a used engine from a wrecker is contemplated, have the seller run the engine before you buy it -- NO RUN, NO BUY! Incidentally, a good source of quality engines and engine components is the Sears Catalog Sales Department.

FIGURE 5
A Typical Chevrolet
327 CID V-8 Engine
With Bellhousing



Remember to include in your engine purchase,

1. The starter motor
2. An alternator or generator
3. Clutch
4. Clutch cover
5. Throw-out bearing and throw-out bearing arm
6. Throw-out bearing guide, type T89B-6 (make sure the mounting flange for this guide fits snugly in the hole in the rear of the bell-housing).

OTHER MAJOR MECHANICAL COMPONENTS

No other major mechanical components are required to complete your Valkyrie Kit. Some "bits and pieces" are:

1. Brake and clutch pedal assembly -- we recommend "Dual Pendulum Pedals," from Honest Charley, Chattanooga, Tennessee. Honest Charley's part number is 78704.
2. Front engine mounts -- the Valkyrie frame is designed to accept the Hurst "Universal Engine Mounts."
3. Rear transmission mounts -- the Valkyrie rear cover plate (see Figure 2) is designed for use with two 1948-1959 Buick Dynaflo transmission mounts (Balkamp #3-5070, Sears Catalog #28 W27041).
4. Clutch slave cylinder -- 1957-1960 Ford F-100 truck (Wagner-Lockheed #FD-24288).

The list above is not an exhaustive list of all other components required to complete your Valkyrie. Other, not strictly mechanical, components are mentioned throughout the text that follows. All component requirements, however, are summarized in a parts list at the end of these instructions.

4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

The assembly of the engine/transaxle unit is accomplished in several steps:

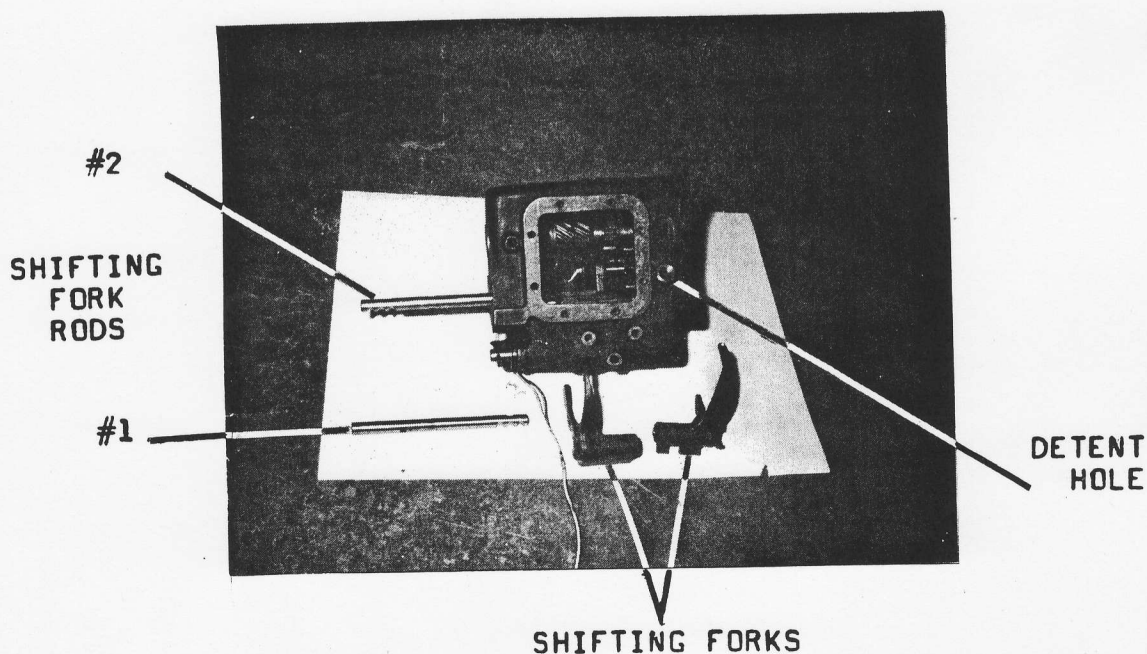
1. Preparation of the engine
2. Installation of the Fiberfab drive-shaft
3. Preparation of the rear hanger-plate
4. Assembly of the engine/gear box/differential into a single unit

ENGINE PREPARATION

Assuming that you have the engine ready-to-go, ie., the engine itself is prepared to your satisfaction -- all "hop-up" and/or "dress-up" items have been installed, the static timing has been set, etc. -- several tasks remain before the engine unit is ready to be coupled to the transaxle. Now the Hurst front motor mount should be attached. The clutch plate and clutch cover should be installed. And the bell-housing should be attached with the throw-out bearing and arm inside (see Figure 5).

FIGURE 6

GEARBOX INITIAL DIS-ASSEMBLY



INSTALLATION OF THE FIBERFAB DRIVE-SHAFT

This step in the assembly of the engine/transaxle is probably the most tedious step in building the Valkyrie Kit. It is in this step that the standard Corvair gearbox input-gear is replaced by the special input-gear/shaft manufactured by Fiberfab. (NOTE: There is a \$10.00 "core-charge" added to the price of the Valkyrie Kit. Return the Corvair input-gear (sometimes referred to as the "clutch-gear") to Fiberfab and \$10.00 will be refunded to you).

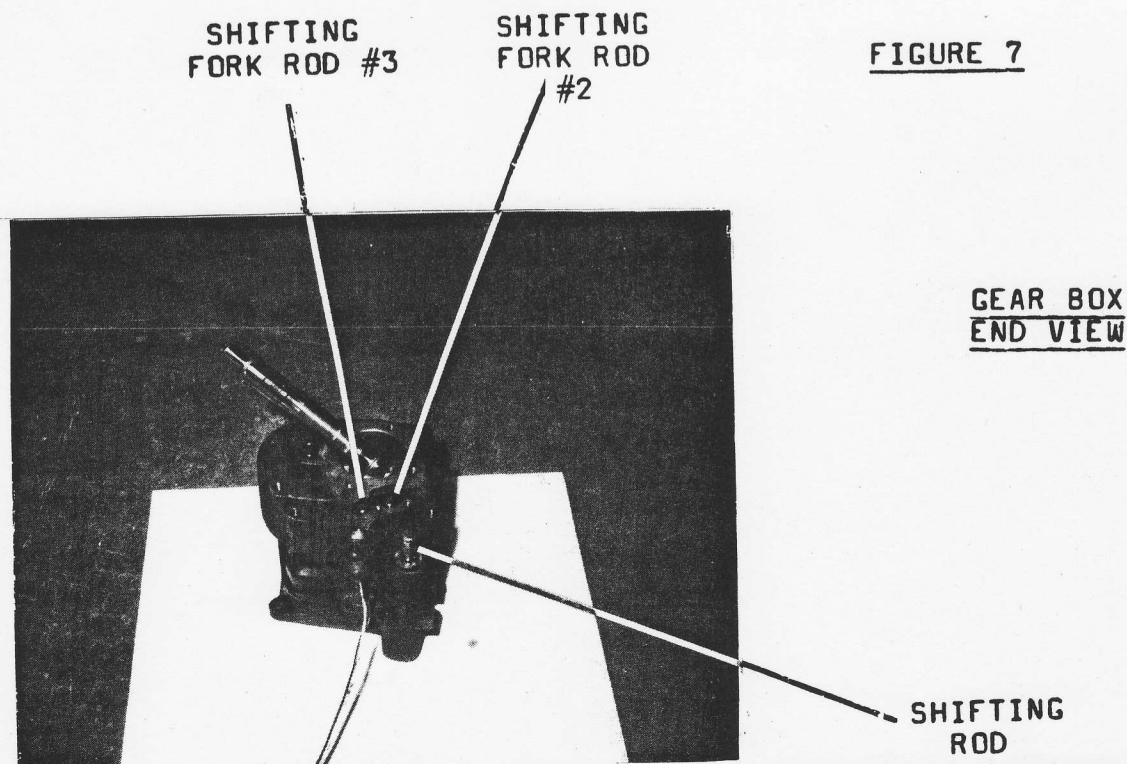
4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

The following sequence of operations should be used to complete the gear/shaft installation.

1. Separate the gearbox and differential housing by removing the four retaining bolts threaded into the differential housing.
2. Remove the gearbox front cover plate (six bolts '65, four bolts '66, '67). The gear (with the splined hub) directly under this cover is the gear to be replaced.
3. Remove the gearbox side cover plate (eight bolts '65, seven bolts '66, '67). The 1966-67 gearboxes have the shifting forks and rods attached to the side cover plate and they are removed with the plate. The 1965 gearboxes have the shifting forks and rods separate from the side cover and they must be removed as described in sections 4-8 below.

Looking through the side opening (see Figure 6).

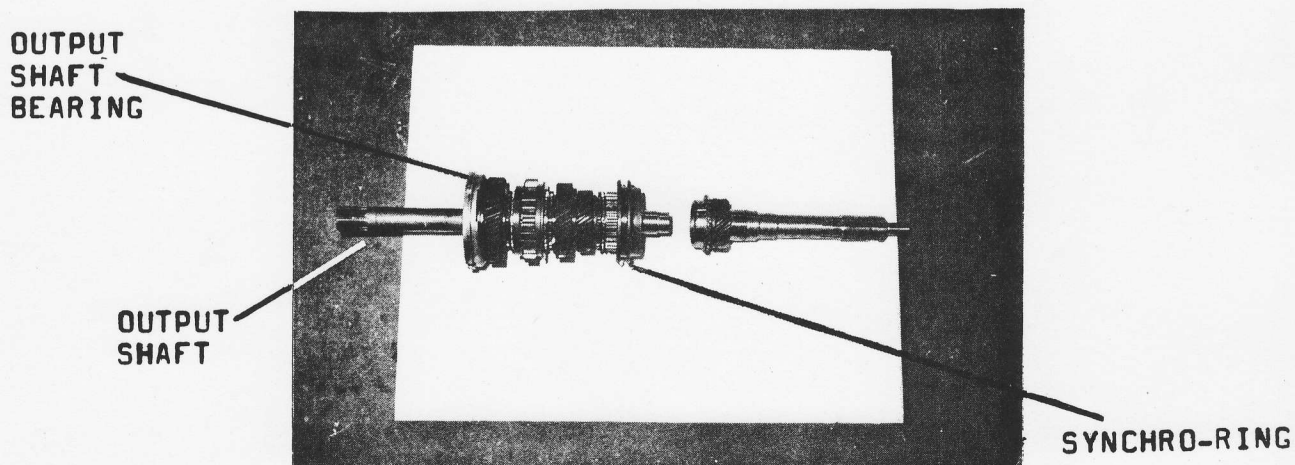
4. Drive out the roll-pins which secure the shifting forks to the shifting fork rods -- if the pins fall into the case, they can be retrieved subsequently.
5. Remove the plug from the detent hole (see Figure 6) and extract the detent and spring noting the order in which they are removed.



4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

6. Drive shifting-fork rod #1 completely out of the case.
7. Drive shifting-fork rod #2 (see Figure 7) to the position shown in Figure 6.. Do not remove the rod because it retains detent balls and springs at the front of the case.
8. Remove the two shifting-forks.
9. Remove the snap-ring from the hub of the input-gear.
10. Remove the input-gear bearing by tapping it out of the case and sliding it over the input-gear hub.
11. Remove the output-shaft (see Figure 8) bearing in its retainer (1965 output-shaft bearing retainers are held in place by two snap-rings. 1966-67 retainers are maintained in position with locking tabs). As the retainer leaves the case so will the main shaft -- take care to remove the main shaft and input-gear as a unit.
12. Note the location and orientation of the brass synchro-mesh cone adjacent to the input-gear. Now withdraw the the input-gear from the main shaft. Do this over a clean rag because a number of needle bearings will fall out of the input-gear hub.

FIGURE 8 STANDARD MAIN SHAFT & FIBERFAB INPUT GEAR/SHAFT

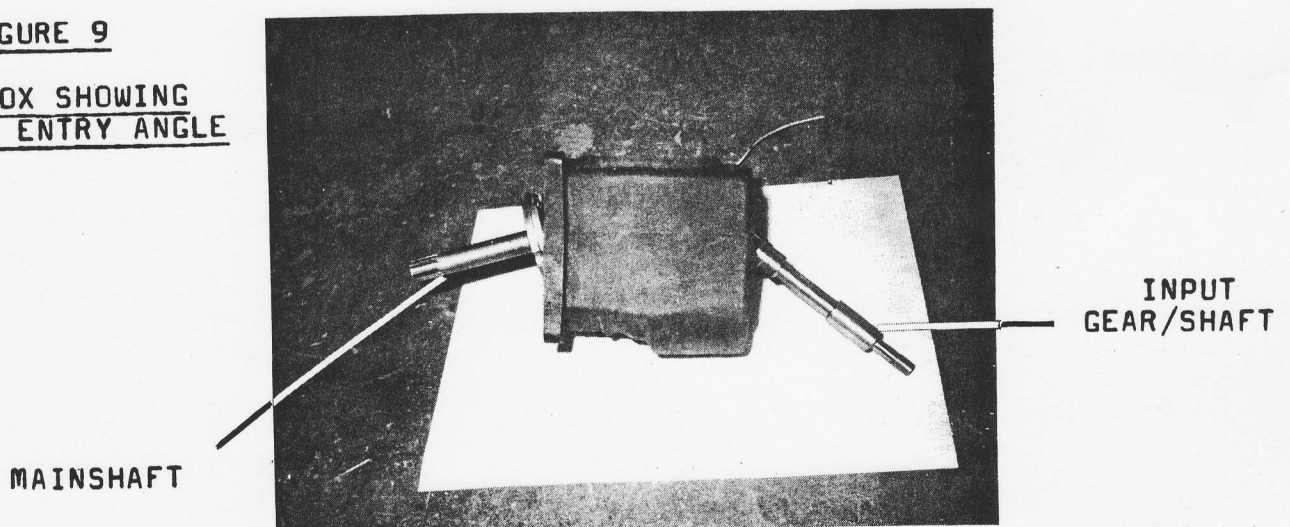


4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

13. Collect all the needle bearings -- there are two rows of needles within the input-gear hub. Coat the inside of the Fiberfab gear/shaft hub with as "sticky" grease as you have available. Now place the needles in the hub using the grease to hold them in position -- the two rows should be full, with no gaps.
14. Slide the synchro ring on the main shaft into the position shown in Figure 8. Place the brass synchro cone in the input gear/shaft.
15. Next, very carefully insert the main shaft and the input-gear/shaft into the gearbox case as shown in Figure 9. Move the gear/shaft carefully to avoid dropping the synchro cone or dislodging the needle bearings. Bring the shafts together and into alignment. Insert the nose of the main shaft into the needle clusters in the gear/shaft hub.

FIGURE 9

GEARBOX SHOWING
SHAFT ENTRY ANGLE



16. Insert the main shaft bearing retainer into place in the gearbox. Slip the input-gear bearing over the gear/shaft and into the gearbox. If the bearings seat properly it indicates the main shaft and gear/shaft have been properly mated. Reinstall the bearing retainers -- both bearings.
17. Reinstall the shifting forks and rods, and the side cover plate. Use a new gasket.
18. Bolt the gearbox to the differential housing.

This completes the installation of the input gear/shaft.

4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

PREPARATION OF THE REAR HANGER PLATE

The rear hanger plate comes to you as shown in Figure 2 -- it is the casting with the label "FIBERFAB." Although the hanger-plate is "as cast" when delivered, it is transformed into a finished part simply by drilling ten holes.

First, drill and tap the rectangular bosses such that the Buick Dynaflo rubber mounts can be affixed to their bottom surfaces. The mounts are attached by bolting through their metal mounting feet -- 3/8" bolts are appropriate. Now place the hanger plate over the rear of the transaxle, engaging the 13" O.D. lip of the transaxle in the 13" I.D. recess in the back surface of the plate. Align the contours of the plate with the contours of the transaxle.. Drill the hanger plate for attachment to the transaxle using the transaxle as a drill jig -- again 3/8" bolts are appropriate. Finally, the "Λ"-shaped rear support is bolted to the rubber mounts.

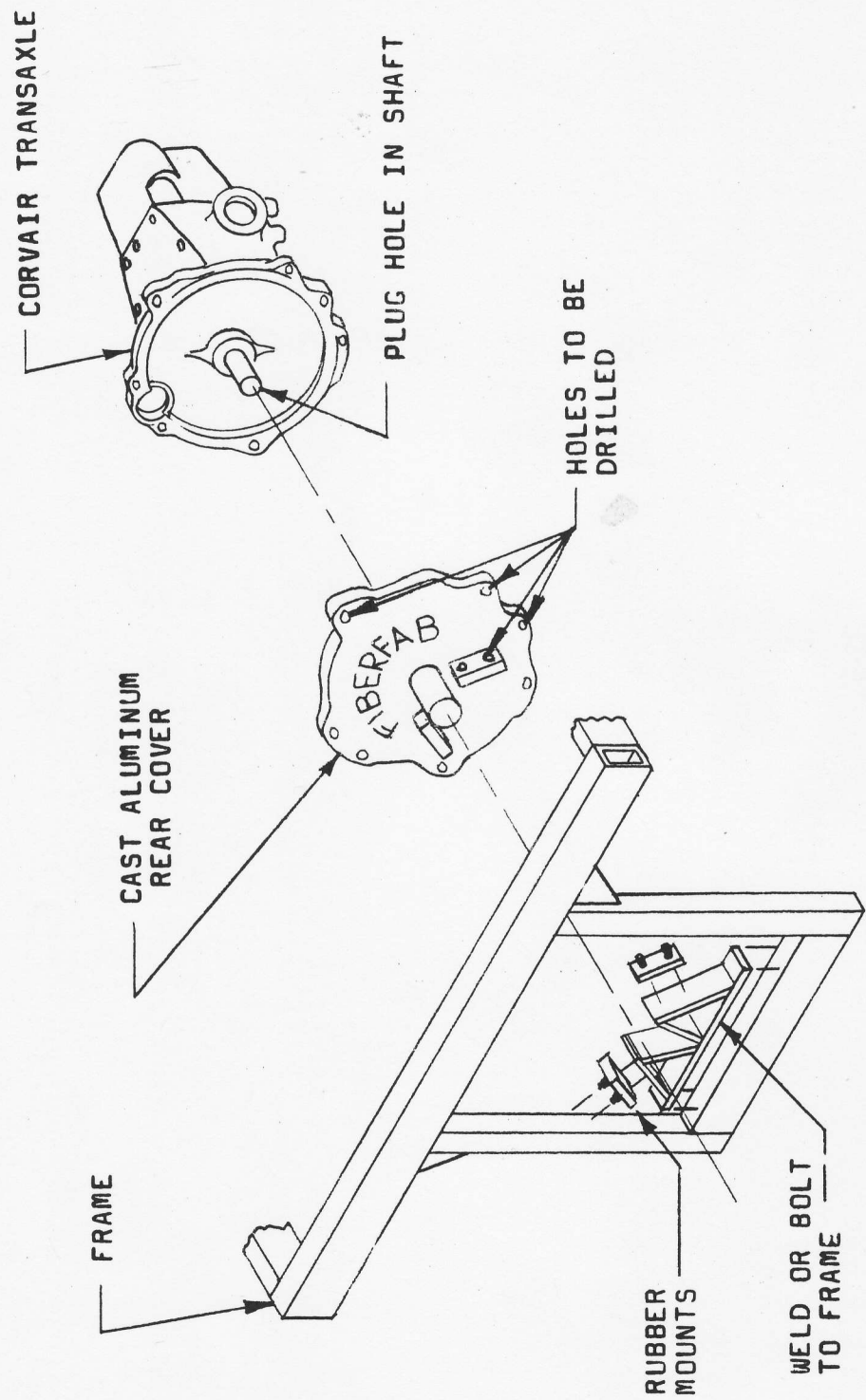
The tasks involved in preparing and mounting the rear hanger plate are summarized pictorially in Figure 10. Note that the rear support is not welded or bolted to the frame until the entire drive-train is in position.

FINAL DRIVE-TRAIN ASSEMBLY

Figure 10 shows an exploded view of the engine/bell-housing-to-transaxle interface. Referring to this Figure -- the Fiberfab adapter plate is bolted to the front of the gearbox case. This joint requires no gasket but should be coated with a non-hardening gasket cement. Note that the holes labelled 1,2,3 and 4 are used subsequently for bolts into the bellhousing -- hole 1 should have a bolt in it before the adapter is attached permanently to the gearbox because once attachment is complete, access to this hole is impaired.

Place the T898-6 throw-out (T/O) bearing guide mounting flange in the recess in the adapter plate. (Two of the holes in the flange will require slight elongation with a file if a '65 transaxle is used -- one hole requires modification with '66-'67 transaxles). Pass four 5/16"-18 bolts -- at least 1-1/2" long -- through the mounting flange, through the adapter plate and into the gearbox case. Now, pass the remaining bolts (for '65 cases: two 5/16"-18, two 3/8"-16 and one 7/16"-14 all at least 1-1/4" long -- for '66,'67 cases four 3/8"-16 at least 1-1/4" long) through the adapter into the gearbox case and tighten all bolts.

FIGURE 10



4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

To complete the drive train assembly the adapter plate is now bolted to the bell-housing. Engage the T/O bearing guide in the T/O bearing. Guide the nose of the gear/shaft into the pilot bearing in the end of the engine crankshaft and, simultaneously, guide the T/O bearing mounting flange into the hole in the rear of the bellhousing. Pass bolts through holes 2,3 and 4 in the adapter (hole 1 should already contain a bolt -- refer to Figure 11), thread into the bell-housing and tighten.

The assembled drive-train should now consist, from front-to-rear, of:

1. Hurst Universal Engine Mount
- 2.. V-8 engine
3. Bellhousing
4. Adapter plate/central drive-train hanger
5. Gearbox
6. Differential
7. Rear cover plate/rear drive-train mounts

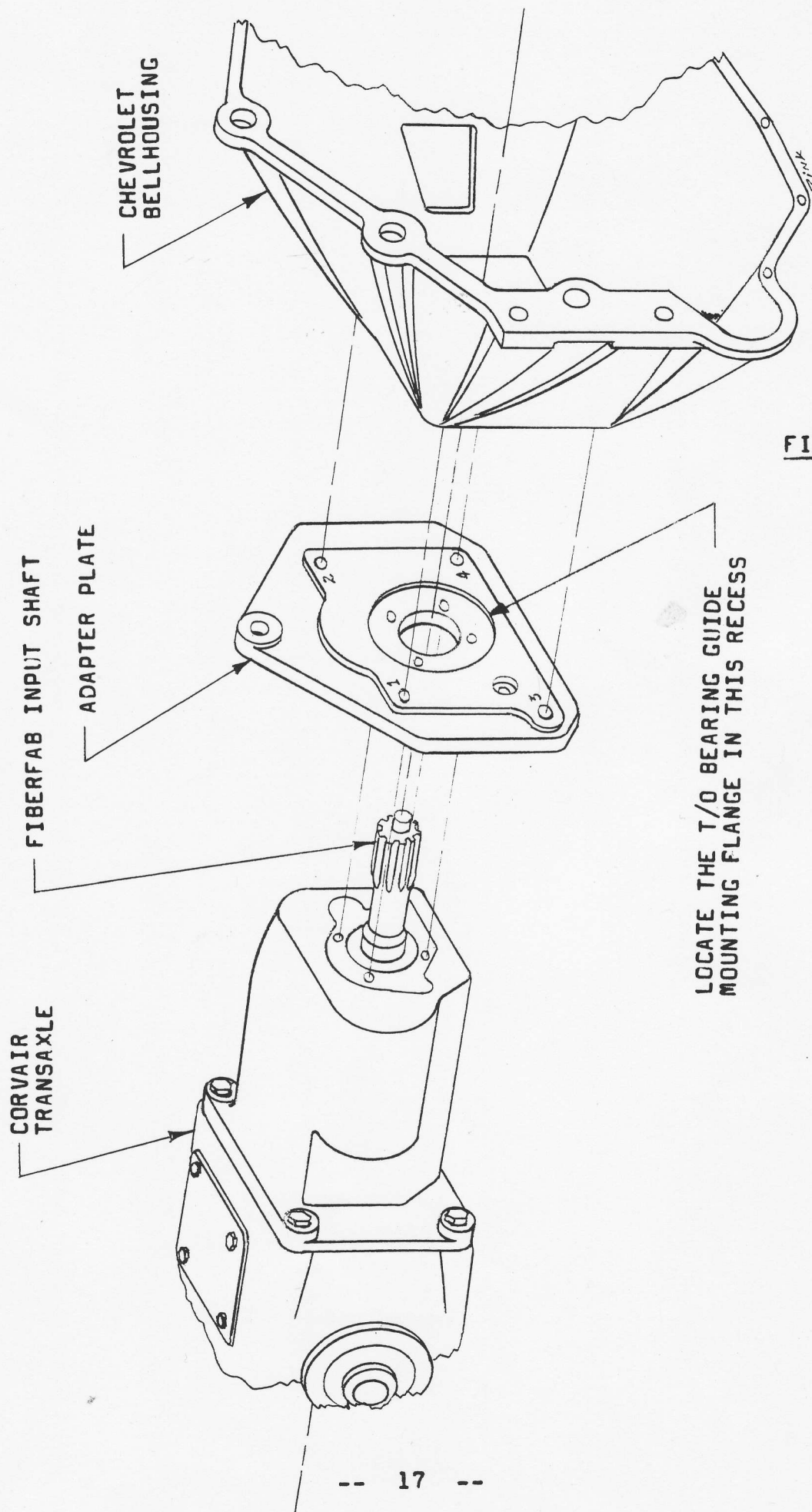


FIGURE 11

5/ INSTALLING THE FRONT SUSPENSION

Installing the front suspension on your Valkyrie chassis is a very simple operation. Four bolts, 2 on each side, (at least $\frac{3}{8}$ " diameter and $5\frac{1}{2}$ " long) are passed down through the suspension mounting holes in the frame forward-side-rails just ahead of the most forward crossmember. These bolts are next engaged in the four holes in the Corvair suspension crossmember (see Figure 4). Lockwashers and nuts are then placed on the four bolts and the nuts are tightened very securely.

If the front suspension was purchased disassembled, it can now be assembled on the ends of the suspension crossmember as shown in Figure 12. (The kingpins should incline back; ie., the top of the kingpin should be behind its bottom; and the steering arms should be attached to the kingpins such that the arms point forward).

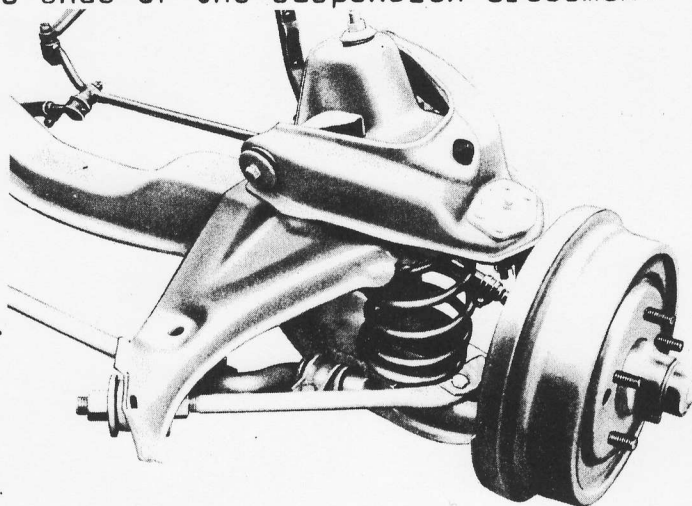


FIGURE 12

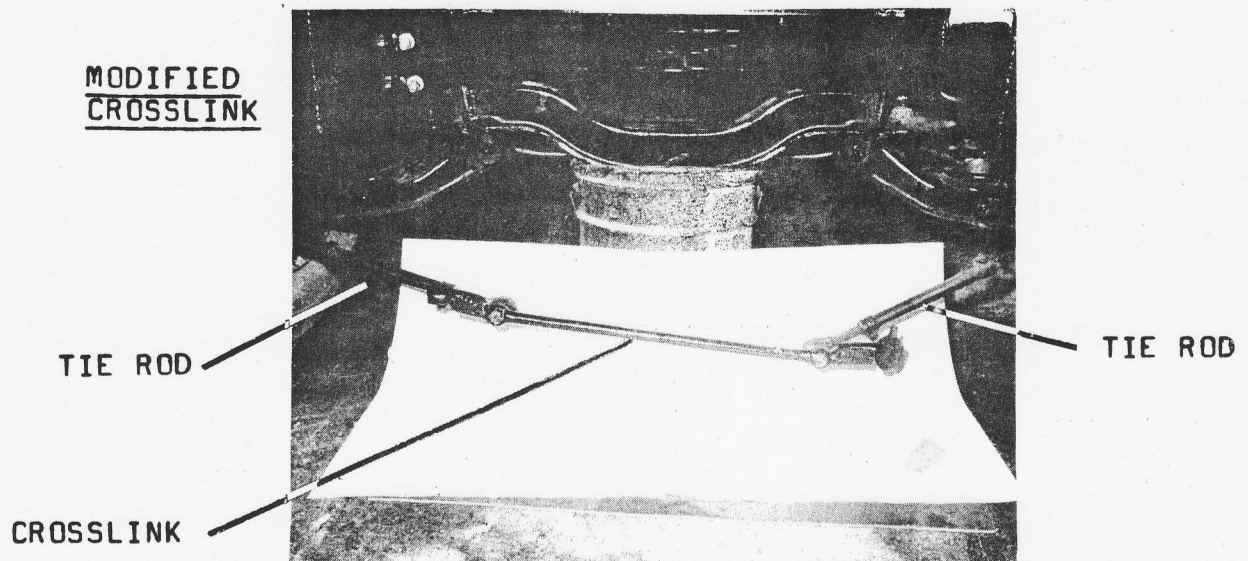
FRONT SUSPENSION ASSEMBLY

No provision is made on the frame to mount any particular steering box inasmuch as many constructors may wish to use a rack and pinion steering arrangement such as is available in Morris Minor, etc. or they may wish to use some quick-steering box other than Corvair. We have found at the factory that the optimum steering set-up -- in terms of ease of installation and high quality of performance -- is the Corvette Stingray ('63 or later Chevrolet Corvette) steering box coupled with a modified Corvair linkage. The Corvette steering box is especially adaptable because it is provided with a flexible-joint input-shaft-coupling which allows easy subsequent location of the steering shaft relative to the dashboard in the cockpit.

The steering box is bolted to the inside of the left, forward side-rail and the idler arm support is bolted to a piece of $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x 5" x $\frac{1}{8}$ " steel angle which in turn is bolted to the inside of the right, forward side-rail. To accommodate the Valkyrie track and frame dimensions, the Corvair crosslink must be shortened to $24\frac{1}{2}$ " (center-to-center between the idler arm and pitman arm pickup points. as shown in Figure 13.

5/ INSTALLING THE FRONT SUSPENSION

FIGURE 13

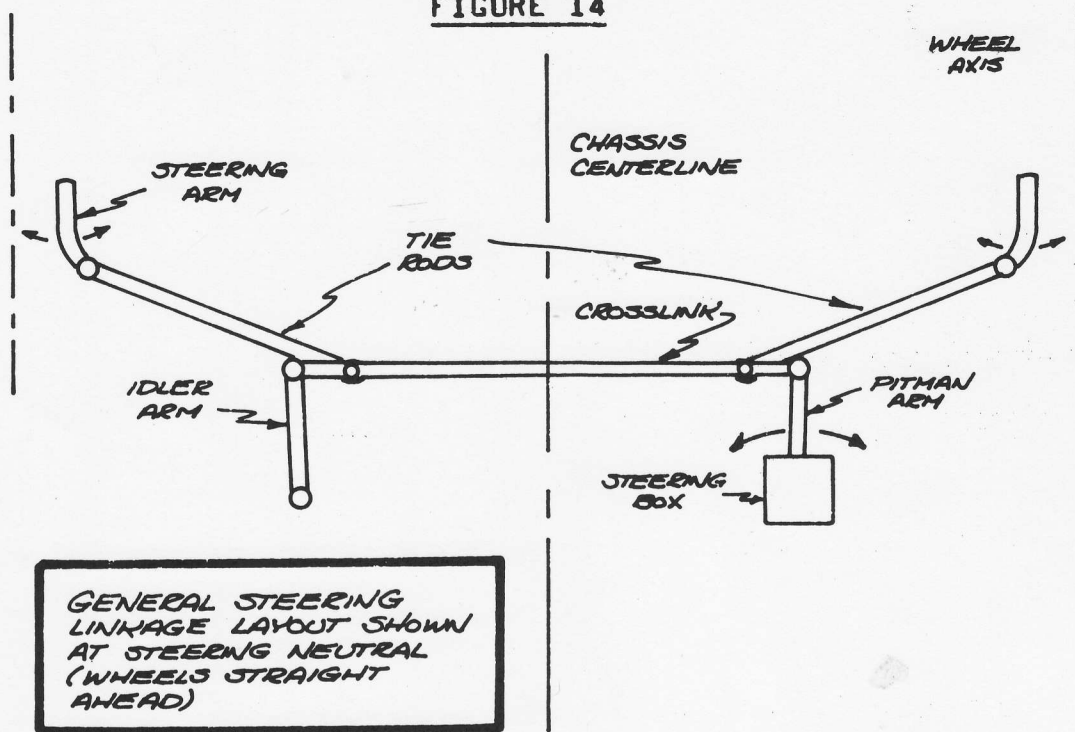


The shortening is best accomplished by cutting and welding with low-hydrogen rod. When the crosslink is cut and rewelded, perfect alignment is essential.

To locate the mounting positions for the steering box and the idler arm bracket, set the wheels parallel and straight ahead, set the tie rods to equal lengths (about midway in its turning range). Engage the idler arm -- mounted on its mounting bracket -- and the pitman arm (the arm on the steering box) with the right and left ends, respectively, of the modified crosslink. Now, the idler arm and steering box are simultaneously positioned on the frame rails (use large C-clamps or equivalent, to temporarily hold these components in place) such that the idler arm and pitman arm are symmetrical to the chassis centerline, in plan (top) view, and the crosslink is perpendicular to the chassis centerline (see Figure 14). In addition, the pitman arm and idler arm should be parallel in side view and should be both nearly parallel with the "road surface." When the three conditions mentioned above are satisfied, permanently attach the steering box and idler arm bracket to the frame.

It should be noted that the three conditions placed on the location of the steering linkage can be satisfied using the Corvair steering box and modified crosslink. The Corvair box, however, has one major drawback: the axis-of-rotation of the pitman arm is not parallel with the steering box mounting surface. Hence, the box cannot be mounted directly on the inner surface of the side-rail -- the rail must be indented to accommodate the Corvair box. Note, too that only '66, '67 Corvair steering boxes have flexible joints in the steering shaft -- earlier units would require that the shafts be cut and a U-joint inserted.

FIGURE 14



6 / INSTALLING THE ENGINE/TRANSAXLE/REAR SUSPENSION

In Section 4 of these instructions, assembly procedures are given which when completed, yield a Valkyrie drive-train ready for installation in the frame. This section describes the installation of the drive-train and the attachment of the rear suspension elements to it (drive-train) and the chassis -- the elements we refer to are all shown in Figure 3.

Prior to the actual installation of the drive-train, the central drive-train-support cross-member is removed from the chassis by breaking the temporary retaining welds. This cross-member is then attached to the bellhousing-to-gearbox adapter plate via a bolt through the rubber bushing in the plate and through the mounting tab at the center of the crossmember.

Once the crossmember is attached to the adapter, the drive-train can be positioned in the chassis such that the HURST front motor mounts rest on the pedestals provided on the frame and and that the rear "M" mount rests as shown in Figure 10. Locate the center of the rear mounting plate 1-1/4" to the left of the center-line (this off-center location results from the asymmetry of the Corvair ring and pinion -- the pinion gear shaft is not centered between the axles, it is 1-1/4" closer to the left-axle). The center-line of the drive-train (ie., the axis of the crankshaft) is inclined slightly with respect to the chassis center-line and, in turn, the base of the "M" plate is not parallel with the frame member upon which it rests (note, however, that the inclination does not exceed 15 degrees and its effect on the operation of the axle universal-joints is negligible).

With the Hurst motor mount bolted to the frame mounting-pedestals and the "M" plate bolted or welded in place, the rear of the drive-train should be lifted until the rear rubber mounts show a slight reduction in compression (ie., their "bulge" is slightly reduced) indicating a lessening in the load they are supporting. With the drive-train in this "lifted" position, the central drive-train support crossmember, and the flanges to which it was formerly welded, can be drilled (two 5/16" holes per flange) and the crossmember bolted in place. The drive-train can now be released from its lifted position.

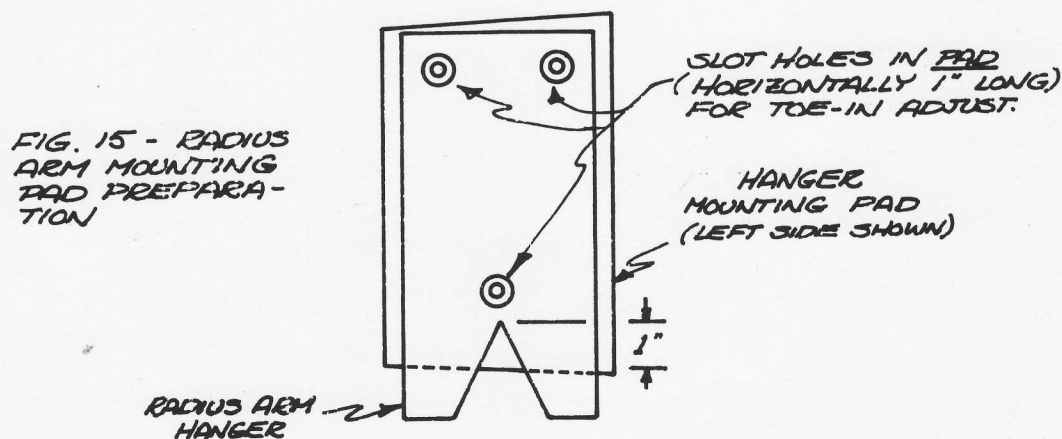
The purpose of the "lifting" procedure described above is to load the central support. If this support were to be installed without lifting the drive-train, it would carry no load and would have little use as a supporting member. Inasmuch as the drive-train is nearly 50" long and weighs about 500 pounds it must be supported at its center -- hence, the lifting procedure must be performed to guarantee the loading on the central support.

6/ INSTALLING THE ENGINE/TRANSAXLE/REAR SUSPENSION

Next, the right and left radius-arms, axles, suspension links, brakes and shock-absorbers can be assembled into two units (these two units are shown in Figure 3, but for purposes of the photograph the right-hand unit is shown on the left and the left-hand unit on the right). Now, the inner ends of the axles are engaged with the universal-joint forks projecting from the sides of the differential housing, and are bolted in place. The lower suspension link pick-up brackets are bolted to the bottom of the differential housing and the inner ends of the suspension links are then bolted in the brackets. The cast-aluminum radius arm hangers (see Figure 2) are bolted to the ends of the radius arms and then temporarily clamped to the mounting pads on the sides of the frame. The springs are placed on top of the radius arms (see Figure 3) and their upper ends are placed in the spring retainers bolted to the ends of the rear frame crossmember (the spring retainers should be midway in their adjustment range).

Wheels and tires should now be bolted to the brake drums -- front and rear -- and the weight of the chassis supported on the tires through the springs. With the rear springs compressed, the shock-absorbers can be attached to their frame mounting pads at the ends of the rear crossmember opposing the spring retainers (once installed, the shock-absorbers serve to retain the springs when the weight of the chassis is removed).

Finally, the temporary clamps holding the radius arm hangers in place are removed. The radius arms should seek their "preferred" static orientation. Some "pushing and shoving" may be required to achieve this orientation if the rubber bushings throughout the suspension took a set during the initial assembly of the suspension elements. When the radius arm hangers are in position as shown in Figure 15, drill the mounting pad through the hanger, using it as a drill jig.



7/ COMPLETING THE CHASSIS PREPARATION

When you finish the construction procedures given in Section 6, your Valkyrie Kit chassis is complete -- the frame, front and rear suspensions, and drive-train have all been assembled together. However, before the Valkyrie body can be mounted on the chassis, preparation must be made for,

1. The hydraulic system
2. The fuel system
3. The cooling system
4. The shifting linkage

THE HYDRAULIC SYSTEM

The hydraulic system for the Valkyrie is comprised of:

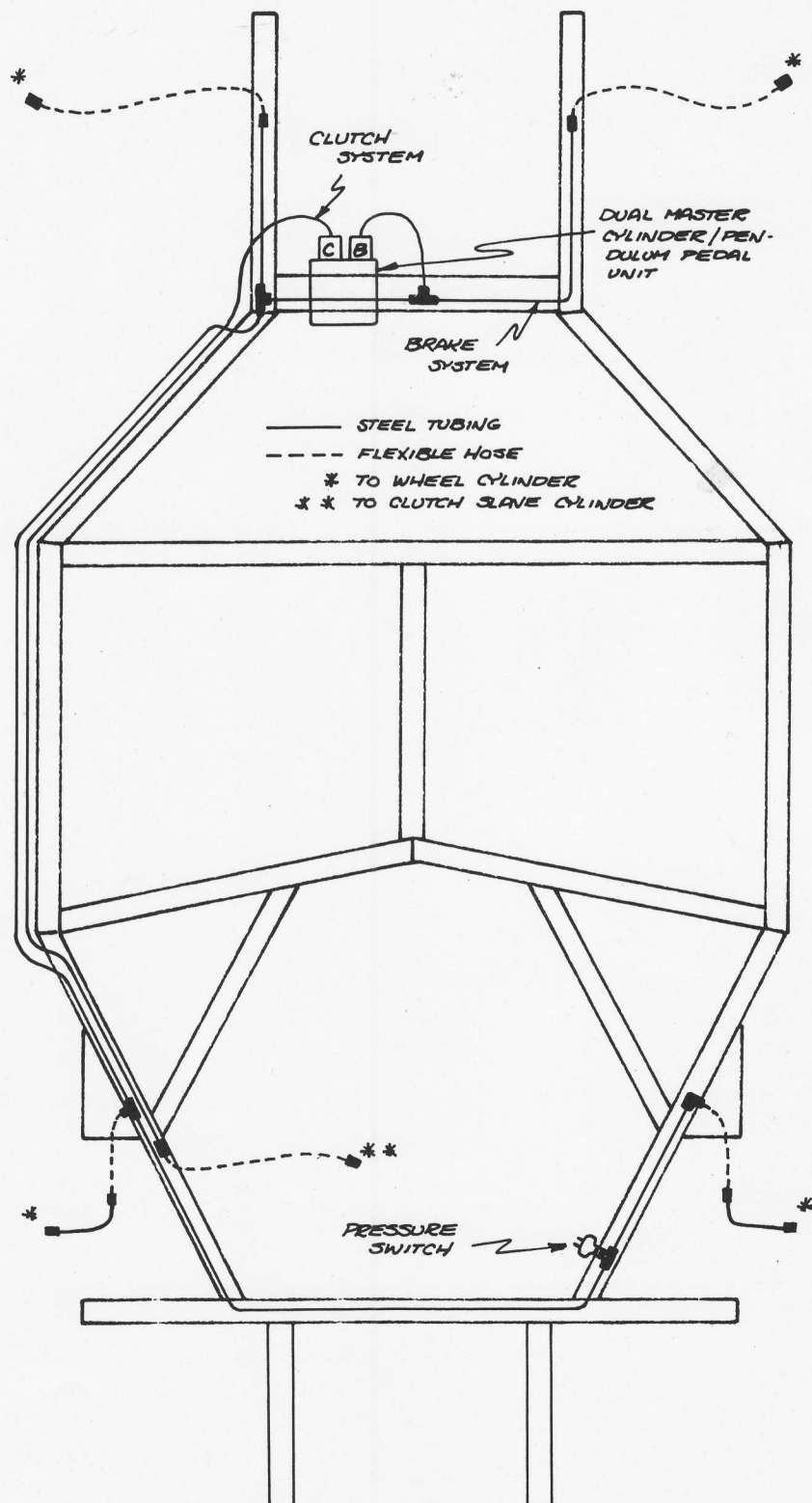
1. Dual master cylinder, pendulum pedal unit (Honest Charley #78704)
2. Wheel cylinders -- integral parts of the Corvair brakes
3. Clutch slave cylinder (eg., 1957-1960 Ford F-100 truck)
4. Five flexible hydraulic hoses
5. Ten sections of various lengths of steel or copper tubing; approximately 40 feet total
6. Five tubing-to-hose adapter fittings
7. Four TEE-fittings
8. Twenty male tubing-terminating fittings (all tubing fittings should be flare-type, not ferrule-type)
9. Three dozen plastic tubing hold-down clamps

Referring to Figure 16 -- the master cylinder assembly is mounted, using a steel-plate angle-bracket, to the top of the front 3" x 1-1/2" crossmember. From the brake master cylinder, tubing is routed to a TEE-fitting mounted near the center of the crossmember. From the TEE-fitting tubing is routed as shown in Figure 16.

The flexible hose coupling the front wheel cylinders to the tubing on the frame must be of sufficient length to allow unrestricted turning, bounce and re-bounce of the front wheels -- restrict the motion of the hose only to avoid abrasion of the hose on suspension components. The tubing to the rear brakes and clutch slave cylinder is fastened with hold-downs along the outside of the frame. The flexible hoses to the rear brakes are just long enough to bridge the radius arm "hinge" -- tubing is run along the top of each radius arm to the wheel cylinders to complete the rear brake hydraulic circuits. At some point in the tubing between the rear brakes a TEE-fitting should be inserted to accommodate a brake-light pressure-switch -- wiring details for this switch are given in Section 9.

FIGURE 16

HYDRAULIC SYSTEM LAYOUT



7/ COMPLETING THE CHASSIS PREPARATION - CONTINUED

THE FUEL SYSTEM

The Valkyries prepared at Fiberfab have successfully utilized several fuel system configurations. One configuration employs specially-prepared gas tanks constructed to exactly fit in the triangular openings in the frame adjacent to the engine bay. These tanks were fabricated of aluminum sheet, heli-arc'd together. The tanks were joined -- bottom-to-bottom -- by a balance tube. Gas is delivered from the right-hand tank to the mechanical fuel pump on the engine block via flexible hose from the tank bottom.

A second configuration uses a Corvair gas tank mounted just ahead of the front suspension crossmember and just above the steering linkage. The wedge-shape of the tank is positioned such that it deflects the air coming through the radiator up through the air vents in the "hood." Because this tank is quite remote from the engine it is advisable to use an electric fuel pump at the tank to pump fuel back to the mechanical pump on the engine. The fuel line should be routed as the brake tubing (see Figure 16) but on the right side of the frame -- be sure to use only steel tubing; copper tubing is attacked by the additives in gasoline. Be sure, also to attach about four feet of #16 wire to the fuel-level sender unit terminal -- this terminal is relatively inaccessible once the body is in place.

Another possible location for a fuel tank is in the space above the gearbox/differential housing just behind the drive-train central-support and ahead of the rear crossmember. A tank in this location would have to be relatively easy to remove to allow occasional access to the differential cover. No supplemental pump would be required.

THE COOLING SYSTEM

The cooling system for the Valkyrie uses a radiator mounted at the very front of the frame with coolant carried to and from the engine by piping along the sides of the frame. The recommended radiator is the Harrison-Delco (GM#3150916) unit used in Corvettes since 1961. This radiator is mounted in a 24-1/2" x 20" frame constructed of 1" x 1" x 1/8" steel angle. The frame is attached to the chassis frame-rails as shown in Figure 17 and to the radiator as shown in Figure 18. Note that the radiator, as used in the Valkyrie, is upside-down. In addition, the overflow pipe must be plugged and a stopcock screwed into the "stopcock hole" -- the stopcock is used as an air-bleed when the cooling system is initially filled.

7/ COMPLETING THE CHASSIS PREPARATION - CONTINUED

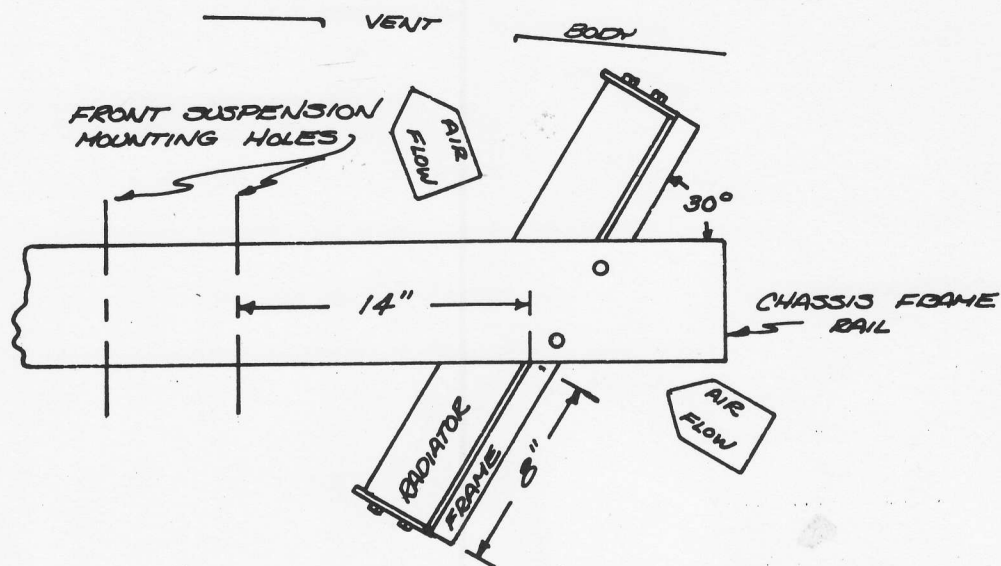
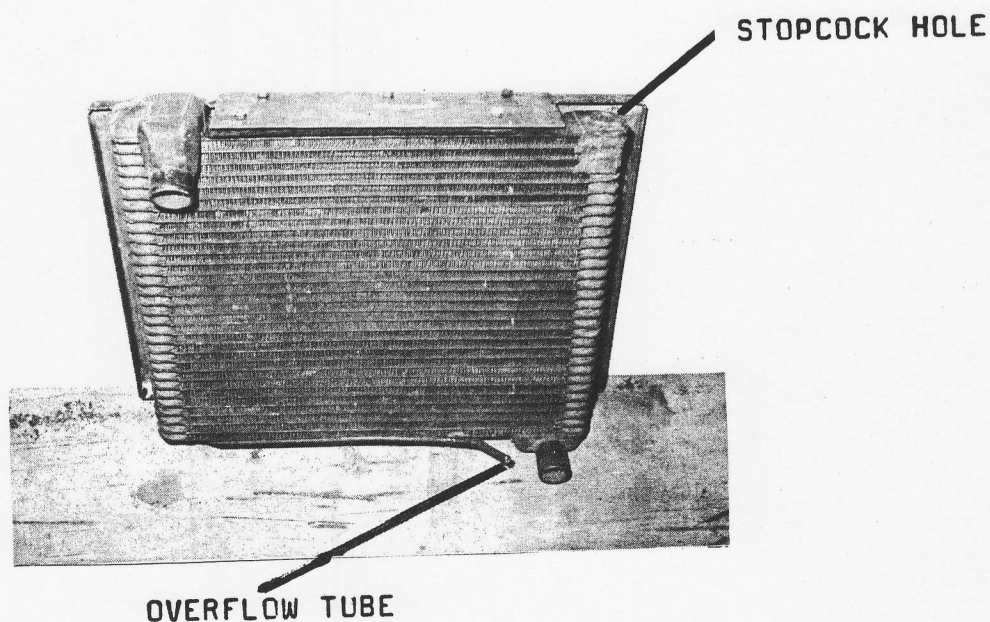


FIG.17 - RADIATOR MOUNTING DETAIL

FIGURE 18
RADIATOR IN SUPPORTING FRAME



7/ COMPLETING THE CHASSIS PREPARATION - CONTINUED

The general routing of the coolant piping is shown in Figure 19. For clarity, the pipes are shown adjacent to the side frame-rails when, in fact, they are routed beneath the frame-rails. The tubing on the right-hand side remains beneath the frame beyond Point "A" (see Figure 19). The left-hand tube rises ahead of Point "B" (see Figure 19) up and over the steering-box -- it is routed tight against the outside of the floorpan/firewall. The left-hand piping terminates at the manifold coolant inlet and the right-hand piping terminates at the pump outlet. The tubing on both sides, however, remains under the frame as it runs inboard towards the engine -- flexible hose is used to route the coolant up to or down from the engine.

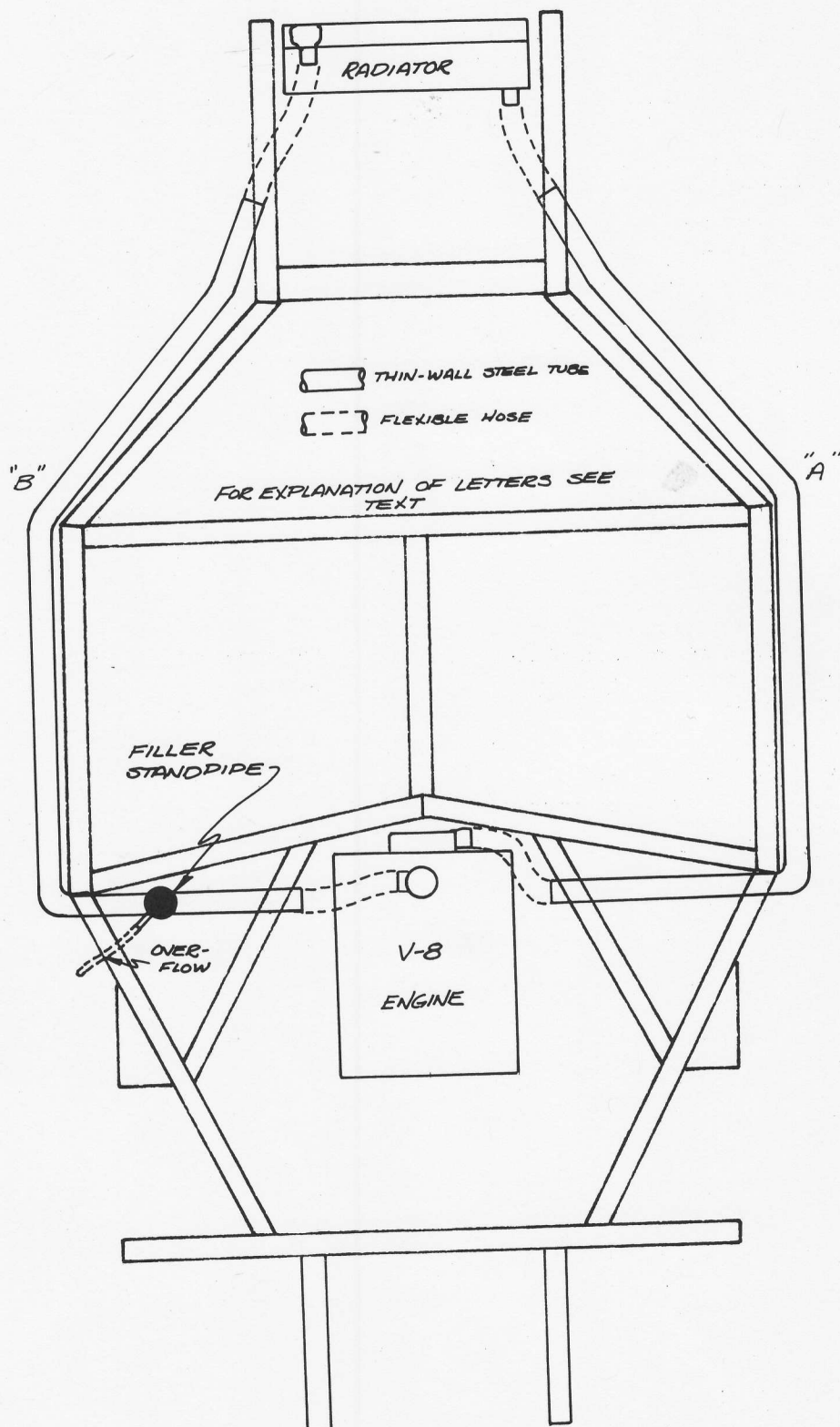
The cooling system is filled through a 2 foot standpipe capped with a standard radiator pressure cap -- overflow is accommodated at this point in the system. The standpipe is "tapped" into the cooling system in the location shown in Figure 19. It projects up from the coolant pipes just behind the driver's seat. (If this location of the standpipe interferes with your gas tank, attach the standpipe further outboard and angle it inboard over the tank).

The coolant system is constructed of thin-wall steel tubing (exhaust-pipe tubing) -- any O.D. greater than 1-1/4" is satisfactory. The routing of the tubing is accomplished by, (a) cutting and welding, (b) careful bending -- avoiding collapse of the tubing, or (c) connecting straight sections with pieces of pre-formed rubber hose (by "pre-formed" we mean short sections of hose permanently formed at different angles). In any case, paint the outside of the steel tubing with rust-inhibiting paint before final assembly and use stainless steel hose clamps for assembly.

Also, in connection with the cooling system, you should saw open the air inlet in the nose of the Valkyrie body and the air outlets in the "hood." If any screening or metal mesh is to be placed in the outlets, now is the time to install it before the body is mounted.

(Figure 19 is shown on the next page. The section concerned with shift linkage begins on page 29).

FIGURE 19
COOLING SYSTEM LAYOUT



7/ COMPLETING THE CHASSIS PREPARATION - CONTINUED

THE SHIFTING LINKAGE

Referring to Figure 7, the Corvair transmission gears are shifted by rotating the shifting rod and moving it in and out of the gearbox -- rotation selects the "1st-2nd," "3rd-4th" or reverse gear gates -- in and out motion selects 1st, 3rd, reverse or 2nd, 4th. Combining the two motions, simultaneously, allows the selection of any one of the five gears ("4-speed" gearbox). The purpose of the shifting linkage, then, is to transfer the back-and-forth and side-to-side motion of the gearshift lever, in the cockpit, back to the shifting rod and convert the side-to-side motion into rotation.

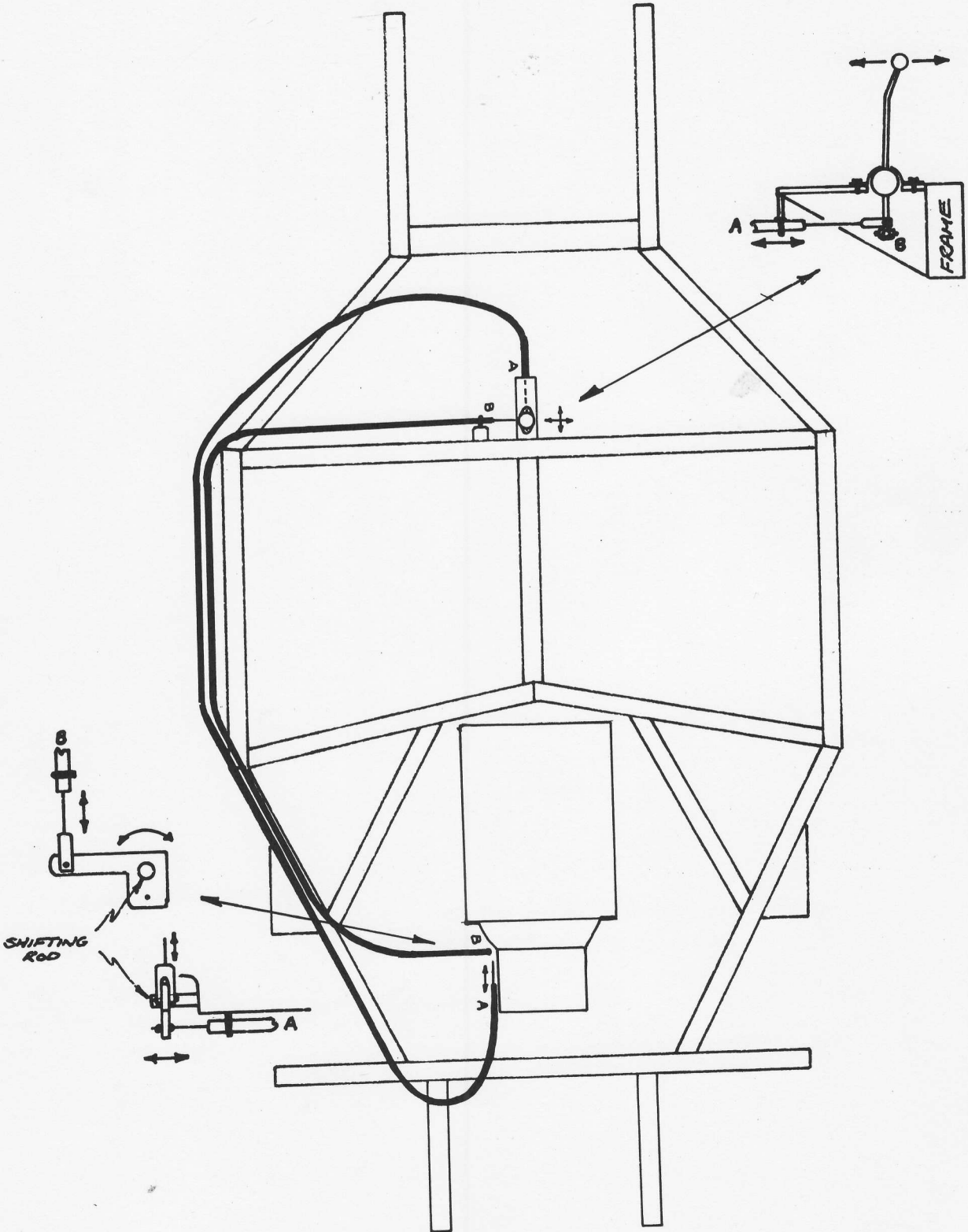
The simplest means of transferring motions is via "push-pull" control cables such as the RED-JACKET cables manufactured by the Morse Instrument Company, Hudson, Ohio 44236 (this address is adequate to contact Morse -- we recommend you peruse their catalog #165 before designing your shifting linkage). Figure 20 illustrates a push-pull cable configuration applicable to the Valkyrie shifting linkage requirements. A suitable gearshift lever can be extracted from a wrecked Volkswagen sedan -- or purchased new from a Volkswagen dealer. The bottom end of the lever is modified to accomodate two Morse A29025 clevises as shown in Figure 20 -- these clevises accept 1/4" material.

The gearshift is supported on a 3/16" steel bracket welded or bolted to the front of the central frame crossmember at its center. The front edge of the bracket should provide a means of clamping the "A" cable -- the "B" cable is clamped to the crossmember. The recommended cables are Morse 42C, the ends of which clamp with Morse A31532 clamps. Cable "A" is 14 feet long; cable "B" 9 feet.

Cable "A" transfers the back-and-forth motion of the gearshift to in-and-out motion of the shifting rod at the transmission. Cable "B" transfers side-to-side motion of the gearshift to up-and-down motion of the end of a lever attached to the shifting rod. The up-and-down motion of the lever, in turn, becomes rotation of the shifting rod. The lever is fabricated of 1/4" steel plate and is pinned onto the shifting rod (it may be necessary, depending on the installation, to cut away a portion of the bottom edge of the Fiberfab adapter plate to gain clearance for the lever).

Cable "A" is clamped to the underside of the gearbox and routed under the left-axle inner universal joint. The "B" cable is clamped to the rear face of the Fiberfab adapter plate and "looped" up and over to the left-side frame-rail as shown in Figure 20.-- minimum recommended bend radius is 8".

FIGURE 20
SHIFTING LINKAGE CONFIGURATION



7/ COMPLETING CHASSIS PREPARATION -- CONTINUED

OTHER CONSIDERATIONS

If considerable driving in traffic in warm weather is contemplated, we advise that you install an electric fan ahead of the radiator. A suitable fan blade and motor are those used by the Jaguar X-KE. Mount the motor on a platform attached to the radiator frame such that the blade is centered in front of the radiator and as close to the radiator as possible. The X-KE blade draws air around the motor so the pitch must be reversed by careful bending -- reversing the pitch forces air away from the motor as desired. Note that simply turning the blade over does not reverse the direction of airflow. The motor is energized by a switch on the dashboard -- wiring details are given in Section 9.

An exhaust system can be installed at any time -- even after the body is mounted. Unless you plan to fabricate your own exhaust system, we recommend that you use the cast iron manifolds as shown in Figure 5 and take your Valkyrie to a local exhaust system/muffler specialist for the balance of the system.

8/ MOUNTING THE BODY

Your Valkyrie body is received with an integral floorpan already laminated into place in the main body section. This floorpan was designed in such a way that it fits exactly into place on the chassis, i.e., with the grooves in the floorpan in front of, between and to the sides of the molded-in seats firmly engaging the frame. In essence, the frame "fits up" into the grooves of the fiberglass floorpan. When the body is properly set on the frame, it is "locked" into position by the design of the floorpan/seats.

Two persons should be available to mount the body -- one on each side lifting the body by a wheel-opening and the top of a side window opening. The body should be carefully "jockeyed" back over the frame with special care being exercised as the radiator enters the nose of the body. Secure the body to the frame using 1/4" x 1" sheet metal screws through the floorpan into the top of the frame -- use washers under the heads of the screws.

Also, secure the nose of the body to the frame using sheet metal screws through the inner panels in the nose into the frame extensions supporting the radiator. No less than 20 screws should be used -- 16 in the floorpan and 4 in the nose.

Now, a hole can be bored through the "firewall" to accept the steering column. The column is passed through the hole until the steering shaft engages the steering box. The column is then clamped in the "valley" between the two large instruments and also at the firewall.

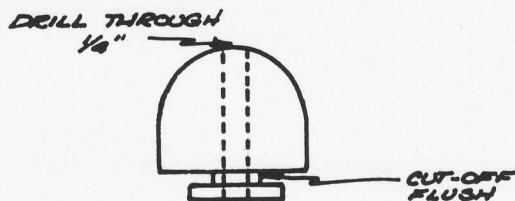
The rear body section of the Valkyrie Kit is delivered with two hinge-pin sockets laminated into it near the bottom edge at the rear. When these sockets are pinned together with the adjustable hinge pivots (attached to the hangers projecting from the rear frame crossmember) the rear section is mounted. The easiest method of adjusting the hinge pivots is to set the rear section in place on the main section and hold it in position with clamps along the edges of the body sections just ahead of the rear window opening. With the rear section clamped, the hinge pivots can easily be aligned with the hinge-pin sockets. When alignment is achieved a 3/8" x 2-1/2" hinge pin should be inserted through each pivot into the socket and the pivot securely bolted in place -- now the clamps can be removed and the rear section support taken by the rear hangers via the hinge pins.

Rubber bumpers used in the Corvair (GM #3732247) are utilized to cushion and help align the rear section against the main body section. The receptacle for the bumper is already formed into the Valkyrie. To use the bumper, prepare it as

8/ MOUNTING THE BODY - CONTINUED

shown in Figure 21. A 1/4" stove-bolt (round head) is used to bolt the bumper to the rear section. We suggest drilling the mounting hole slightly oversize to allow you to move the bumper for perfect adjustment. The receptacle for the bumper is so designed that the bumper must be swollen by tightening the stove-bolt. Be sure to use a washer under the nut. We also suggest double-nutting the stove-bolts to insure that your adjustments of rear section alignment, once made, will remain intact.

FIGURE 21



9/ MOUNTING THE ELECTRICAL COMPONENTS -- WIRING

This section of the instructions provides the ground-rules for installing the electrical system in your Valkyrie Kit. The configuration described below is based on the factory-assembled wiring harness which has proved most adaptable to a variety of engine/lighting/instrumentation combinations. The configuration is also based on our experience regarding the most convenient, practical or serviceable placement of electrical system components.

To begin, an electrical system/wiring harness should provide:

1. Engine starting
2. Engine ignition
3. Engine instrumentation -- temperature, oil pressure
4. General instrumentation -- fuel level, battery/generator condition
5. Interior lighting
6. Exterior lighting
7. Power for accessories (switch controlled and/or direct)

At this stage in the construction process, many items to be wired have already been installed with the drive-train (ie., engine/transaxle), viz., the starter, starter-solenoid, ignition-coil, generator (or alternator), oil-pressure*, oil-temperature** (if used), water-temperature* senders and the fuel-level sender in the gas tank -- a reverse-light switch is available at the bottom front of the gearbox (see Figure 7) -- see Figure 16 for brake-light switch position. The following items, however, have not been installed:

THE LIST BELOW TABULATES THE ITEMS TO BE INSTALLED PLUS REMARKS CONCERNING MOUNTING LOCATION AND RECOMMENDED SOURCES (IF ANY) FOR THE ITEM.

1. BATTERY -- assuming a front-mounted gas tank; in the triangular opening in the frame on the right side of the engine -- #24 size (10-3/16" long, 6-3/4" wide, 8-11/16" high) 12-volt battery.
2. VOLTAGE REGULATOR -- on the bulkhead (back of the seats) to the right of the engine.

*warning light switch or gauge sender unit

**sender mounted as replacement drain plug in oil pan

9/ MOUNTING THE ELECTRICAL COMPONENTS -- CONTINUED

3. TAIL LIGHTS/BRAKE LIGHTS -- in the rear panel of the rear body section wherever a pleasing appearance is achieved -- late model Corvette Stingray lights mounted three per side -- outside pair and inside pair used for tail lights (low filament, red lens), outside pair used as turn indicators (high filament), inside pair used as brake lights (high filament) and center pair used as back-up lights (high filament, white lens) -- note that these lights constitute six, non-interchangeable units, ie., each fits in a particular location (RH Outside, LH Center, LH inside, etc.).
4. FRONT PARKING/TURN INDICATOR LIGHTS -- in the two recesses adjacent to the nose opening in the body -- late model Pontiac Gran Prix or GTO parking lights.
5. HEADLIGHTS -- in the molded-in recesses provided in the Valkyrie body -- post-1958 Chevrolet dual headlight units -- be sure to position the dual filament lamp to the outside of the body.
6. WINDSHIELD WIPER MOTOR -- in the upper, rear corner of the right-side, front wheel-well -- any LUCAS windshield wiper assembly as found in Austin-Healey, Triumph, Jaguar (not X-KE), etc.
7. HEADLIGHT DIMMER SWITCH -- on the "firewall" just to the left of the clutch pedal -- any standard dimmer switch, eg., Corvair.
8. HORN -- on the inside, front end of the left-side frame-rail (about where the radiator frame is attached but closer to the end of the frame-rail) -- any relay-operated horn, eg., Mustang.
9. HORN RELAY -- on the left-side splash panel inside the front, left wheel-well just above the steering-box -- any standard, three-terminal horn-relay, eg., Corvair.
10. COURTESY LIGHT SWITCHES -- in the door jamb between the hinges in both door openings -- Corvette-type, two-terminal, flange-mounting switches.
11. COURTESY LIGHT -- in the raised area between the seats, sufficiently high that it illuminates the console area -- Corvette courtesy light.

REMEMBER -- unlike steel, fiberglass is an insulator, Any electrical component mounted in fiberglass requires a separate ground (return-path) wire.

9/ MOUNTING THE ELECTRICAL COMPONENTS - CONTINUED

Your Valkyrie Kit body is delivered to you with a fiberglass dashboard and console already in place (see Figure 22). It is not necessary for you to laminate or otherwise attach the dashboard to the body -- this has been done at the factory. The dash is designed to utilize a centralized instrument control cluster -- the cluster is the hub of the wiring harness and should be carefully planned. The standard instrument/control configuration used in factory built cars is:

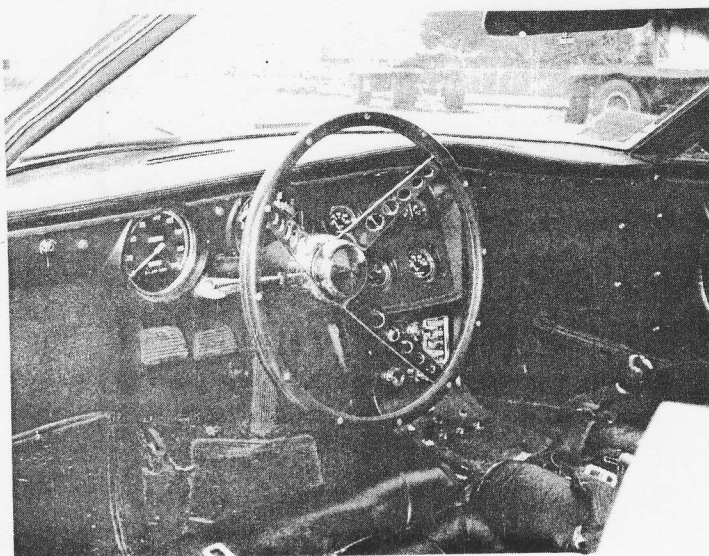


FIGURE 22

1. Key-operated ignition switch (Lock-Off-On-Start)
2. Headlight switch (preferably with provision for instrument light dimming and courtesy light control)
3. Windshield wiper switch (SPST)
4. Fan switch (SPST)
5. Other accessory switches as required
6. Fuel-level gauge
7. Ammeter (discharge warning light may be substituted)
8. Oil-pressure gauge (warning light may be substituted)
9. Oil-temperature gauge (optional)
10. Water-temperature gauge
11. Speedometer (non-electrical except for lighting)
12. Tachometer (optional) *
13. High-beam indicator light
14. Turn-indicator dash lights

For your convenience we have listed below the numbers of the STEWART-WARNER gauges and accessories used in the factory built cars. These items may be ordered from your local representative of Stewart-Warner or directly from Fiberfab.

<u>VALKYRIE 12-VOLT</u>	<u>S-W NUMBER</u>	<u>PRICE</u>
Ammeter (generator)	D359-CE	\$8.45
-- Ammeter (alternator)	D359-CW	8.05

* The tachometer sender, if remote from the gauge, should be mounted on the rear bulkhead near the engine but in an area which avoids excessively high temperatures.

9/ MOUNTING THE ELECTRICAL COMPONENTS - CONTINUED

<u>VALKYRIE 12-VOLT</u>	<u>S-W NUMBER</u>	<u>PRICE</u>
Fuel level gauge	D301-AW	\$11.15
Fuel level sender	D385-B	6.20
Installation kit	366-LP	1.65
Water temperature gauge	D311-CC	11.45
Water temperature sender	D362-BY	3.15
Oil pressure gauge	D306-BB	11.15
Oil pressure sender	D353-Z	7.50
Oil temperature gauge	D311-CF	11.45
Oil temperature sender	D362-AH	4.35
Tachometer (integral sender)	D960-AA	54.00
Speedometer (0-160 MPH)	D530-DH	17.50

Lighting for the gauges listed above is provided by D366-CH lamp kits @ \$1.00 per kit.

The wiring harness is divided into three major pieces -- the hub or dashboard section, the hub-to-front harness and the hub-to-rear harness. Figure 23 shows the general routing of these harnesses relative to the Valkyrie frame.

The hub-to-rear harness is routed from the hub down to the floorpan then back through the central longitudinal frame member. As the harness exits the rear of the frame member, eight wires emerge and the balance in the harness are routed right along the central transverse frame member. In the vicinity of the generator three wires emerge. In the area of the voltage regulator, three more wires emerge. When the harness reaches the outside frame-rail, it is routed back along it. At the drive-train central support two wires are routed left and down to the reverse-light switch. At the brake-light switch two wires exit the harness. From the brake-light switch the harness continues back and down the right, rear hanger for the rear body section. At the end of the hanger the harness terminates six wires in a connector..

Referring to the numbers shown in Figure 23, the wires in the hub-to-rear harness terminate as follows

1. Connector -- tail light power (16)*F**
2. Connector -- brake light power (16) B

--
 * numbers in parentheses refer to recommended wire size
 ** F=from hub, T=to hub, A=ahead in harness (away from hub),
 B=back in harness (towards hub)

9/ MOUNTING THE ELECTRICAL COMPONENTS - CONTINUED

3. Connector -- right-turn indicator power (16) F
4. Connector -- left-turn indicator power (16) F
5. Connector -- back-up light power (16) B
6. Connector -- ground (a short wire from the connector to a hinge-adjusting bolt) (16)
7. Brake-light pressure switch -- brake light power (16) A
8. Brake-light pressure switch -- +12 volts, fused (16) B
9. Reverse-light switch -- back-up light power (16) A
10. Reverse-light switch -- +12 volts, fused (10) F (16) A
11. Battery (+) terminal and voltage regulator "BAT." terminal -- charging current (10)
12. Voltage regulator "ARM." terminal -- charging current from ammeter (10) F
13. Voltage regulator "FIELD" terminal -- generator field control (16) B
14. Generator armature -- charging current to ammeter (10) T
15. Generator field -- generator field control (16) A
16. Starter solenoid -- +12 volts from ignition key (16) F
17. Oil temperature sender -- signal to gauge (16) T
18. Oil pressure sender -- signal to gauge (16) T
19. Water temperature sender -- signal to gauge (16) T
20. Ignition coil (+) or "SW." terminal -- +12 volts from ignition key (16) F
21. Tach signal (from sender or coil) -- (16) T
22. Spare -- (16) T
23. Courtesy light -- +12 volts from switches (16) F
24. Courtesy light -- 12 volt return (ground) (16) F

Again referring to Figure 23 -- the hub-to-front harness is routed from the hub up to the cowl. Then to the left under the cowl to exit the cockpit through the firewall. Two leads are routed back to the left-hand door courtesy light switch; the balance are routed forward atop the side frame-rail to the radiator frame. Three leads emerge from the harness in the vicinity of the dimmer switch and four emerge at the horn relay.

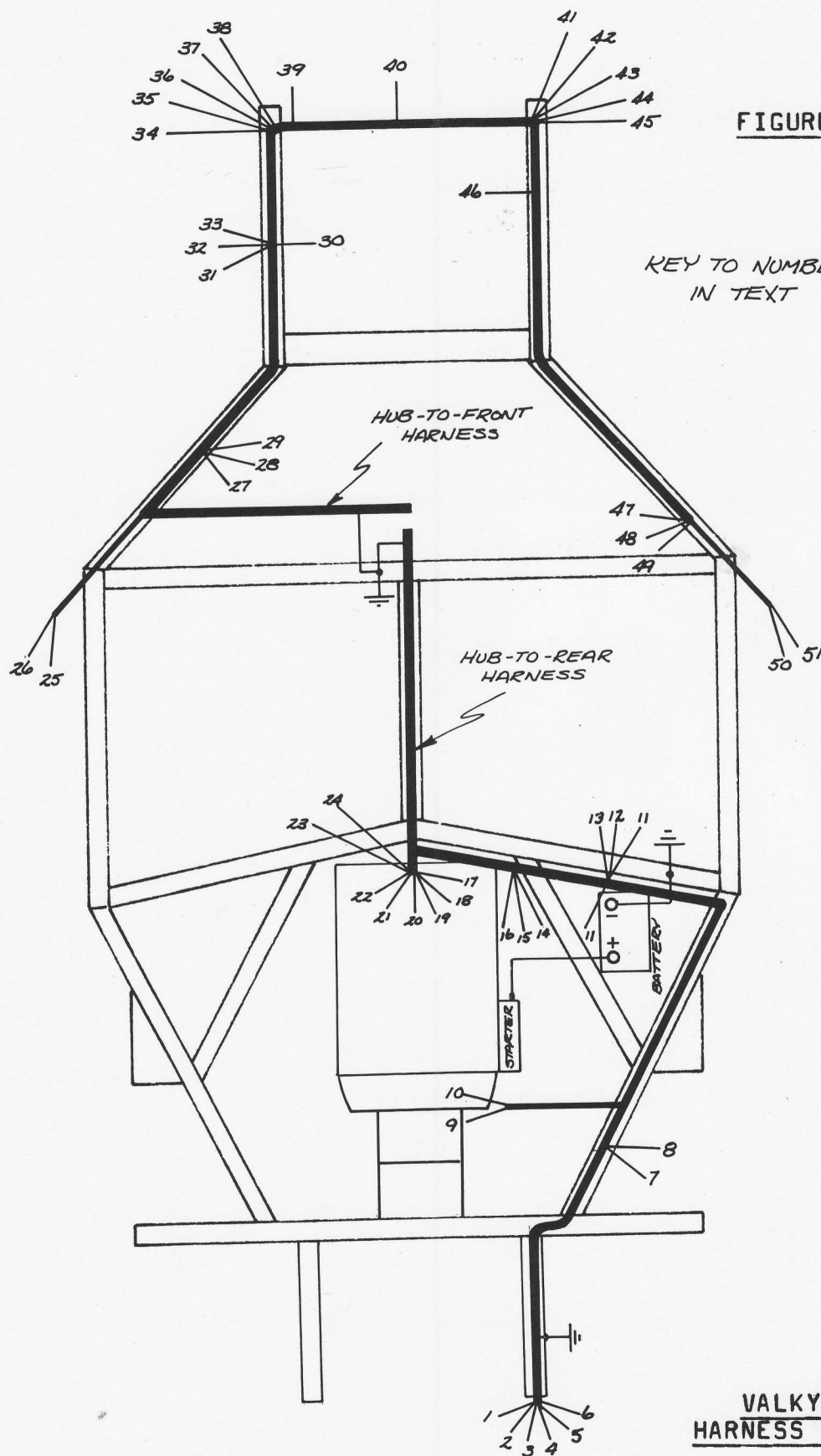


FIGURE 23

KEY TO NUMBERS
IN TEXT

**VALKYRIE WIRING
HARNESS ARRANGEMENT**

9/ MOUNTING THE ELECTRICAL COMPONENTS - CONTINUED

At the radiator frame, outside the splash panel, five leads are brought out of the harness to the parking and headlights. The harness is then routed right, through the splash panel, over the top of the radiator frame, and through the right splash panel. Just inside the left splash panel a single lead to the horn emerges and another lead is brought out at the center of the radiator frame. Just outside the right splash panel five leads exit the harness to the parking and headlights.

From the right side of the radiator frame, the harness is routed back along the side frame-rail to the right-hand door hinge sockets. Near the front of the frame-rail a single lead is brought out, if required, for the electric fuel pump. Near the hinge sockets three leads exit for the windshield wiper motor. Two leads extend into the hinge area to the right-hand door courtesy light switch.

In terms of the numbers shown in Figure 23, the circuits carried in the hub-to-front harness are,

25. Courtesy light switch (left door) -- courtesy light power (16) T
26. Courtesy light switch (left door) -- +12 volts, fused (16) F
27. Headlight dimmer switch -- +12 volts from headlight switch (10) F
28. Headlight dimmer switch -- low-beam power (10) A
29. Headlight dimmer switch -- high-beam power (10) A
30. Fuel-level sender -- signal to gauge (16) T
31. Horn relay "signal" terminal -- signal from horn button (16) F
32. Horn relay "hot" terminal -- +12 volts (16) F
33. Horn relay "control" terminal -- power to horn (16) A
34. Lamps ground -- (10) F (10) A
35. Headlight high-beam -- high-beam power from dimmer switch (10) B (16) A
36. Headlight low-beam -- low-beam power from dimmer switch (10) B (16) A
37. Left-turn indicator lamp -- "flasher" signal (16) F
38. Parking lamp -- +12 volts from headlight switch (16) F (16) A
39. Horn -- "control" signal from horn relay (16) B
40. Cooling fan motor -- +12 volts, switched, fused (16) F

9/ MOUNTING THE ELECTRICAL COMPONENTS - CONTINUED

41. Parking lamp -- +12 volts from headlight switch
(16) B
42. Right-turn indicator lamp -- "flasher" signal (16)
F
43. Headlight low-beam -- low-beam power from dimmer
switch (16) B
44. Headlight high-beam -- high-beam power from dimmer
switch (16) B
45. Lamps ground -- (10) B (16) A
46. Electric fuel pump -- +12 volts, switched, fused
(16) F
47. Windshield wiper motor ground -- 12 volt return (16)
B
48. Windshield wiper motor "run" terminal -- +12 volts,
fused (16) F
49. Windshield wiper motor "start" terminal -- 12 volt
ground, switched (16) F
50. Courtesy light switch (right door) -- courtesy light
power (16) T
51. Courtesy light switch (right door) -- +12 volts, fus-
ed (16) F

The factory hub wiring includes a six-fuse fuse-block with integral flasher (turn indicator interrupter) unit. A Corvair fuse-block, or equivalent, is appropriate. The fuse-block is mounted on the firewall, at its center, about 10 inches above the floor. The fuses are used for:

1. Headlights
2. Parking/courtesy/instrument lights
3. Brake/back-up lights
4. Windshield wiper motor, cooling fan
motor and fuel pump
5. Spare for accessories
6. Flasher unit

Hub wiring includes the following (#16 wire unless other-
wise noted):

1. Wire all gauge/instrument grounds together and to
ground
2. Wire all gauge/instrument lights together and to
"dimmer" terminal on headlight switch
3. Wire gauge "ignition" terminals together and to
"accessory" terminal on ignition switch

9/ MOUNTING THE ELECTRICAL COMPONENTS - CONTINUED

4. Wire ammeter "charging" (+) terminal to,
 - (a) Lead #14 (see Figure 23)
 - (b) "BAT." terminal on ignition switch
 - (c) "BAT. 1" terminal on headlight switch through fuse #1
 - (d) "BAT, 2" terminal on headlight switch through fuse #2
 - (e) Lead #10 through fuse #3
5. Wire ammeter "discharging" (-) terminal to lead #12
6. Wire ignition switch "accessory" terminal to
 - (a) Fuel pump
 - (b) Windshield wiper motor and cooling fan switch through fuse #4
 - (c) Fuse #5
 - (d) Flasher through fuse #6

The remaining hub wiring is fairly obvious; e.g., the starter solenoid is wired to the "SOL." terminal on the ignition switch, the ignition coil is wired to the "IGN." terminal on the ignition switch, the headlight dimmer switch is connected to the headlight switch, etc.

To complete the wiring, the rear body section is wired as an independent unit. The tail light, brake light, back-up light and turn-indicator(s) light wires are routed to the right side hinge and terminated in a connector to mate with the hub-to-rear harness (leads 1-6). If a license plate light is incorporated, its power is derived from the tail light circuit.

10/ INSTALLING THE WINDOWS AND DOORS

Your Valkyrie kit includes the front windshield, the rear window and two doors with inner panels. This section describes the installation of these items.

The Valkyrie is designed specifically to use the Chevrolet Corvair, passenger car, windshield and surrounding chrome trim (the trim is available from your local Chevrolet dealer -- use the parts numbers given in the parts list appended to these instructions). The rear window opening of the Valkyrie is designed to accept the Ford Mustang "fastback" rear window, rear window rubber molding and chrome surrounding trim (the trim and rubber molding may be purchased from your local Ford dealer -- again using the parts numbers in the appended parts list).

The windshield is installed using silicone rubber sealant (see Chapter 2/Construction Materials). The lip of the windshield opening is filled with sealant and the windshield glass is immediately pressed into place. Next, the chrome trim is pressed into place around the glass and the excess sealant is wiped away before it commences to set. Do not disturb the glass for at least eight hours after installation.

The rear window is installed by first placing the rubber molding around the glass and then placing a talc-covered (for slipperiness) 1/8" cord (venetian blind cord is typical) in the groove around the outside of the molding. (If chrome trim is used, the trim-retaining clips should be screwed in place around the window opening before the glass is installed. Small wood screws will suffice to hold the retainers securely).

Then the window is put in position in the window opening as shown in Figure 24 (Drawing A). Now, with the window being pushed firmly into the opening, a person in the car withdraws the cord -- Figure 24 (Drawing B) -- from the groove by pulling perpendicularly to the windshield surface. As the cord is pulled out of the groove, fully removed, the molding should completely engage the lip as illustrated in Figure 24 (Drawing C). After the rear window is installed, the chrome trim can be snapped into its retainers.

Side windows may be as elaborate as you desire. The most simple window would be a piece of Plexiglas (clear plastic) permanently affixed above the door and sealing against foam rubber weatherstripping when the door is closed.

We have successfully installed Ford LTD (1966 4-door hardtop ---front window) curved glass roll-up windows, using a Mustang vent window and window guides. This installation makes an elegant side window arrangement but requires considerable ingenuity on the part of the builder to make it smoothly operable.

A side window kit is available from Fiberfab which uses a fixed vent window and a stock roll-up mechanism which can be obtained from a used car wrecker.

10/ INSTALLING THE WINDOWS AND DOORS - CONTINUED

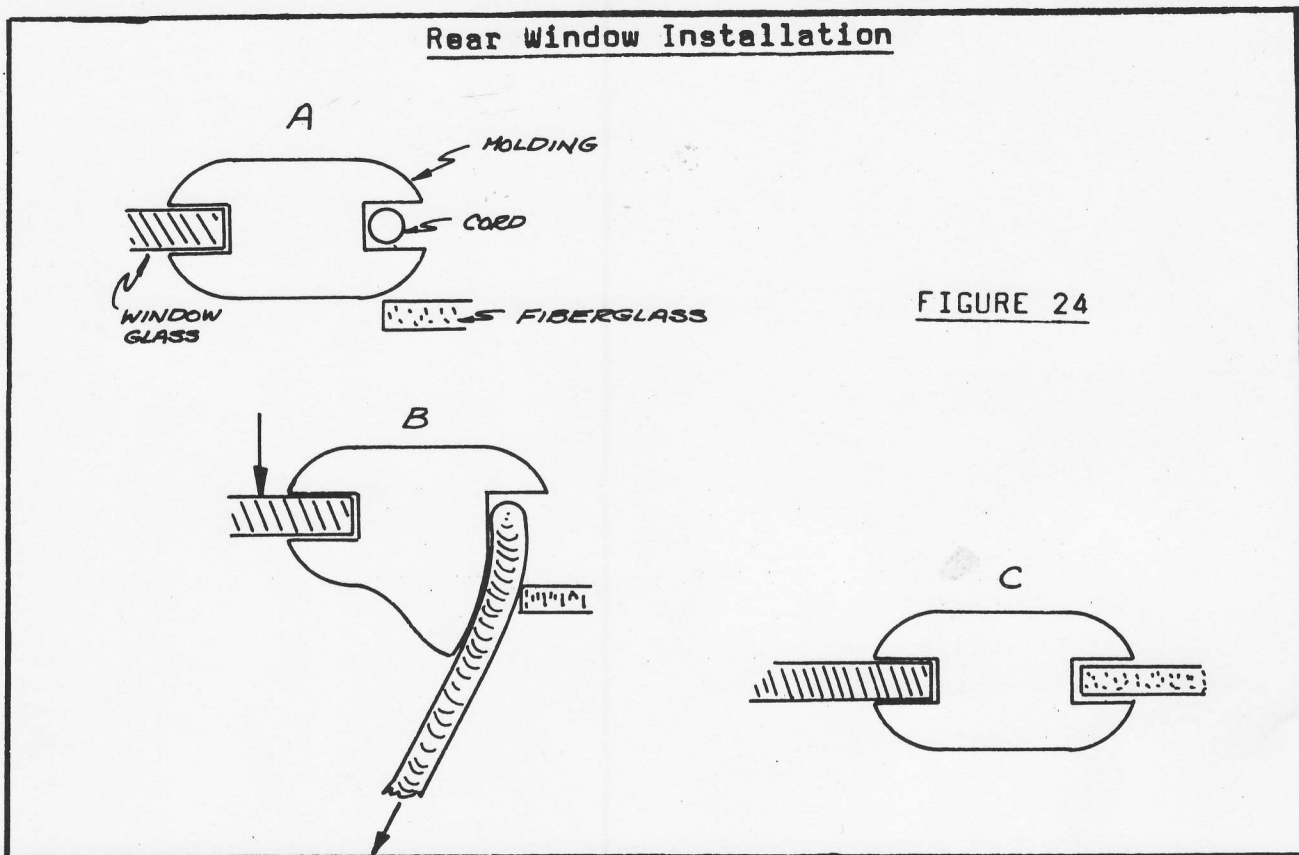


FIGURE 24

- The steps to be taken to install the Valkyrie doors are:
1. Attach the hinges to the doors as shown in Figure 25. Do not tighten.
 2. Cut out the hinge socket openings as shown in Figure 26. The outline of the cut-out is imprinted in the door jamb as a guide for cutting.
 3. Position the doors in the door openings. Clamp temporarily.
 4. Attach the hinges to the hinge sockets in the body -- use shim, if required.
 5. Secure all bolts -- in the door and in the hinge sockets -- and release the clamps.

The hinges that are used on the Valkyrie doors are obtained from your local Ford dealer (or a wrecking yard) as 1965 Ford passenger car, front-door hinges (see the appended parts list for details). Note in Figure 25 that the Valkyrie uses the Ford right-hand hinges on the left door and vice-versa. Also the top Ford hinges are mounted at the bottom of the Valkyrie doors.

10/ INSTALLING THE WINDOWS AND DOORS - CONTINUED

We have found at the factory that door mounting operations are expedited considerably by using nut-plates and "horseshoe shims" (see Figure 27) in the hinge sockets. Four nut-plates per door are required along with an assortment of shims (a dozen of each thickness should be sufficient). The nut-plates are installed on the inside of the hinge sockets, in the same manner as nuts but do not require a wrench for tightening. Once the hinge mounting bolts are engaged in the nut-plates, all shim-
ming, fitting and tightening of bolts in the hinge sockets can be accomplished by one person working in the wheelwell.

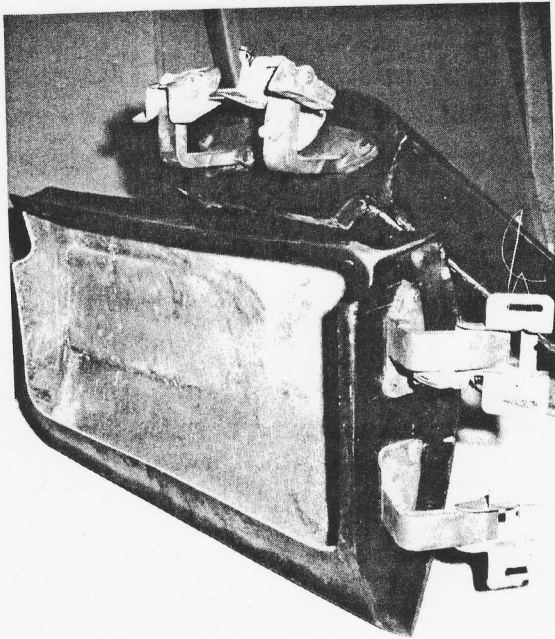


FIGURE 25

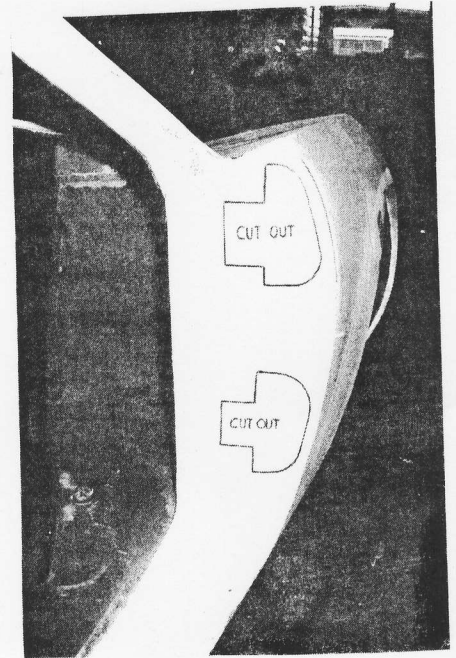
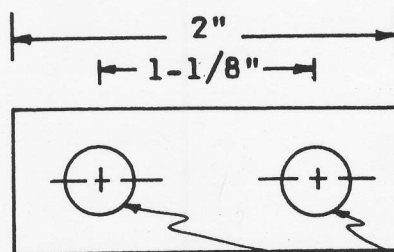


FIGURE 26

Material:
1/4" steel



NUT PLATE

Drill and
tap 5/16--18

Material:
1/32" aluminum
1/16" aluminum
1/8" aluminum

HORSESHOE SHIM

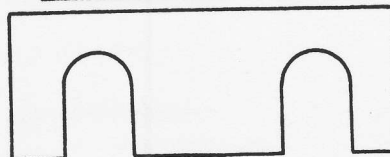


FIGURE 27

11/ FINISHING THE INTERIOR -- UPHOLSTERY

The upholstering of your Valkyrie is purely a matter of personal taste. You can be as austere or as elaborate as you desire -- purely functional for the "road machine" buff or posh for the grand touring enthusiast.

At the factory, we use, of course, the Valkyrie upholstery kit (available from Fiberfab at extra cost). The upholstery kit consists of automotive-grade carpet cut to fit the firewall, floor, and headliner areas. The carpet is bound with 1-1/2" wide carpet-binding to prevent fraying. The headliner carpet is extended down the windshield pillars. Also in the kit are the vinyl door panels, custom vinyl "sling" seats and a quart of "fast tack" trim adhesive.

If you have access to a commercial, heavy-duty sewing machine you can make your own carpeting and interior trim. The materials required are:

1. 4 yards vinyl (54" wide)
2. 10 yards carpet (36" wide)
3. 2 yards carpet-jute for padding under floor carpet
4. 50 yards, 1-1/2" wide carpet binding
5. 2 sheets, 3' x 4', waterproof panel board approximately 1/8" thick
6. 1 quart trim adhesive -- "fast tack" variety
7. 20, grommet-head trim screws and bezels
8. 8' canvas (34" wide)

Use heavy paper to make patterns of the interior surfaces of the car. Transfer this pattern to the carpet (make sure it is not upside-down) and cut. Sew on the binding. The same "paper-pattern" technique is used to develop the door panels which are constructed of vinyl sewn to panel-board -- a "customizing" effect can be gained by sandwiching up to 1" foam rubber sheeting between the vinyl and the panel-board and then stitching a design in the vinyl.

Before installing the carpets -- especially the headliner -- rough-up the fiberglass surfaces to be covered with any coarse sand paper. After sanding, wipe the surfaces with lacquer thinner or acetone. If the surfaces are not prepared, the carpet may not properly adhere, particularly the headliner carpet.

When the surfaces are ready, coat them thickly with adhesive -- also coat the back side of the carpet (or jute padding for the floor). When the adhesive is tacky, install the carpet. Wood blocks are glued into the windshield pillars to provide a mounting surface for the carpet in that area. Door panels are

11/ FINISHING THE INTERIOR - UPHOLSTERY

glued in place, or preferably, attached with chrome-plated, grommet-head wood screws backed with chrome-plated bezels.

The Valkyrie seats are molded into the fiberglass floorpan. If the seat position is exactly right for you, the seats need only be covered with a vinyl-over-foam rubber pad to be completed. If, however, the seating position needs to be adjusted forward and/or up "sling" seats should be employed as in the factory-built cars. Figure 28 shows the method to be used to install the seat supports or "slings." The sling is made with loops at either end as shown in the figure. Metal strips are inserted in the loops and the sling is secured to the fiberglass by trim screws passed through the canvas and metal strips into the floorpan. The vinyl-over-foam rubber seat cushion can be either laid in the canvas sling or sewn directly to it to prevent it from sliding.

Other items to be considered for interior finishing include ashtrays mounted in the console, interior light mounted between the seats, etc. The console surface may be covered with adhesive-backed plastic sheet imprinted with a wood-grain (available from 3M and other manufacturers). The dash may be padded and vinyl-covered. Etc. Etc. Let your imagination be your guide!

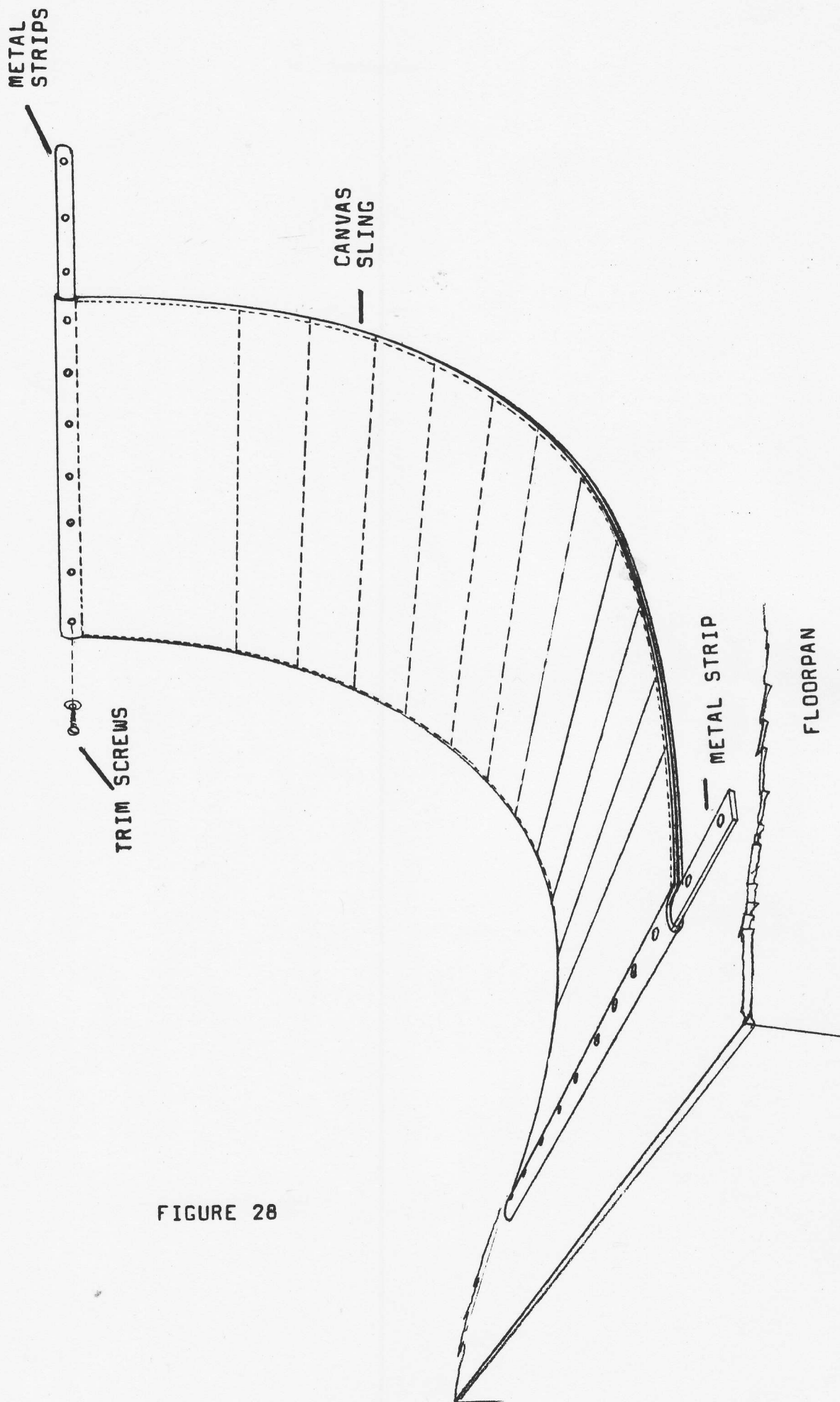


FIGURE 28

12/ FINISHING THE EXTERIOR -- PAINTING

The most important item in the area of exterior finish is, of course, the painting. The "first impression" others will have of your Valkyrie is dependent on the quality of the painting. Fortunately, it is possible to achieve a beautiful exterior finish using only a spray gun -- no elaborate bake-ovens, etc. are required.

Fiberglass is very compatible with acrylic lacquers. Lacquers, also, are the easiest and most trouble-free finishes to apply. They can even be applied in a slightly dusty environment -- the dust and any spraying imperfections can be subsequently rubbed out. Just follow the instructions which accompany the lacquer -- spray where there is plenty of ventilation and don't attempt spraying on cold and/or damp days.

About body surface preparation -- most fiberglass bodies have slight imperfections such as pin holes or marks made by mold parting lines. Often a few scratches will be added during shipment. Body putty (eg., "Green Stuff") and fine sand paper should take care of any body surface imperfections you might encounter.

We are proud of the surface finish of our bodies. We use special care in preparing mold surfaces and special materials around body edges to minimize chipping. One of our own Aztecs, which has travelled over 50,000 miles in all types of weather and over all types of roads, does not have one body crack. It still retains its original paint, too!

Your Valkyrie kit body will have a color when you receive it. In most instances, this color will be black. This is not the finished color. It is a special Gel-Coat finish your body has been given to achieve the best possible surface.

Before you paint your Valkyrie, the entire body should be lightly sanded with #400 sandpaper (preferably wet-sanded). The sanding is done in order to "scuff up" the surface which is otherwise too slick to allow the paint to properly adhere. Remember to sand lightly -- you are scuffing the surface, not re-styling the body!

Following the sanding, the body should be washed off and wiped with Prepsol or some other paint preparation liquid to eliminate any lingering dust, oil or dirt (be particularly careful to remove oils from fingerprints, etc., as these oily spots will produce "fisheyes" in the finish). The body is now ready for primer and paint.

12/ FINISHING THE EXTERIOR - CONTINUED

Other items of exterior finish are:

1. TAIL SECTION LATCHES. We use, on the factory-built cars, Ford Falcon or Mustang hood latches. Two are required -- one on each side of the car. The latch is mounted just ahead of the rubber bumper cup in the horizontal surface intersecting the rear wheel opening. The latch stud is mounted in the tail section. The operating arms must be shortened to clear the inner surface of the body and the safety catch should be removed from the latch used on the passenger's side of the car.

Many other latches are suitable. For example, the key-operated variety used as hood latches for MG-TF, etc., offer a measure of security as well as holding down the tail section.

2. DOOR LATCHES. Any conventional door latch can be used such as Mustang, Corvette, etc.
3. HEADLIGHT COVERS. These can be made from 3/16" Plexiglas by heating and forming over an appropriate mold. Covers are also available from Fiberfab at extra cost. The covers are installed using small "L-shaped" tabs around the headlight opening to which the cover can be attached -- five tabs per cover should be sufficient. These tabs can be made of sheet metal should you desire.

Be sure to check with your local Department of Motor Vehicles to find out whether the use of headlight covers at night is legal in your state.

4. AIR SCOOPS - ENGINE AIR INTAKES. The air scoops on the side of the Valkyrie body can be made functional if you wish. The upper ducts can be utilized to provide fresh air to the cab a-la-Mustang fastback. The lower ducts can be used to supply cool air to the engine compartment via flexible hose (we have found laundry dryer vent-hose to be quite satisfactory for air ducting purposes).
5. MIRRORS. For the interior rear-view mirror, any mirror which mounts (using epoxy glue) to the windshield, such as T-Bird can be used. For side mirrors, there are any number of mirrors which can be used. The 1965 Mustang mirror is good.

THE FORD 289 "PROBLEM"

Fiberfab strongly recommends the use of the Chevrolet 283-327 series of engines with the Valkyrie kit. The kit was engineered specifically to accept these engines.

However, some people have wished to use the 221-289 series of Ford engines with the Valkyrie kit, either out of a personal preference for Ford products or because they had a Ford engine on hand.

The Ford engines are not as easily utilized with the Valkyrie kit but, with one exception, they can be used if a "Ford-to-Chevy" bellhousing is used.

These special bell housings are available at speed shops throughout the country and from automotive specialty outlets by mail such as Honest Charley's Speed Shop in Chattanooga, Tennessee. The bell housings themselves are made by the Trans-Dapt Company of California. The numbers given below are the Trans-Dapt numbers.

The Trans-Dapt Number for the TRANSMISSION is #25.

ENGINE SERIES:

Ford	221 thru 289 1962-1964	
	5-Bolt Housing (Not T & C Transmission)	
	USE TRANS-DAPT AF-900 -----	\$32.99
Ford	260 thru 289 1965-1967	
	6-Bolt Housing (Not T & C Transmission)	
	USE TRANS-DAPT AH-922 -----	\$34.99
Ford	289 1965-1967	
	6-Bolt Housing (T & C Wide-Bolt)	
	TRANS-DAPT HAS NO BELLHOUSING AVAILABLE	
	(PLATE ONLY) -- <u>THEREFORE THIS ENGINE IS</u>	
	<u>NOT SUITABLE FOR VALKYRIE INSTALLATION.</u>	

Throughout this construction booklet, we have referred to parts which can be used in the completion of your Valkyrie. Here is a list of items which have been previously mentioned in the text.

In many instances part numbers are given to assist you in obtaining the items from a Ford or Chevrolet dealer. Remember that appreciable savings (with no sacrifice of quality) can be achieved if you wish to get the items from a wrecking yard.

Also, there are many alternative types of parts that can be used, particularly for tail lights, etc. Let your imagination be your guide!

HARDWARE ITEM	MANUFACTURER	DESCRIPTION AND/OR MANUFACTURER'S PART #
TRANSMISSION GROUP-1965	General Motors Chevrolet Corvair	
Case		3899186
Input (clutch) gear		3851508
Side cover gasket		3775033
Needle bearings(72)		7451240
TRANSMISSION GROUP-1966 -1967		
Case		3874333
Input (clutch) gear		3859987
Side cover gasket		3858990
Needle bearings(72)		7451240
Differential case -1965		3855502
-1966		3873484
Differential case -1967		
Differential cover gasket - all years		6257706
Bellhousing (aluminum, typical)	General Motors	3785564
Throw-out bearing guide (T89B-6)	Corvette - GM	3709331
Gas tank (1960-1964)	Corvair - GM	3785035

HARDWARE ITEM	MANUFACTURER	DESCRIPTION AND/OR MANUFACTURER'S PART #
Vent window assembly	Ford Motor Co.	1965 Mustang wind-wing
Side window guide assembly	Ford Motor Co.	C5A2 - 67222A57C
Side window glass	Ford Motor Co.	1965 LTD 4-door hardtop front window glass
Window lift mechanism	Chevrolet	1955 passenger car
Door lock cylinders	Ford Motor Co.	C50Z-6221984-A1
Door latches	Ford Motor Co.	Left - C4SZ-6321813-C Right - C4SZ-6321812-C
Tail section rubber bumper	Chevrolet	3742247
Tail section latch and stud	Ford Motor Co.	C5ZZ-16700-A C5ZZ-16929-A
Door hinges RH top RH bottom LH top LH bottom	Ford Motor Co.	C5AZ-6222810-C C5AZ-622280C-B C5AZ-6222811-C C5AZ-6222801-B
Headlight assembly	Chevrolet	897185 897186
Parking lights	Pontiac	Gran Prix or GTO
TAIL LIGHTS RH outboard LH outboard RH inboard LH inboard	General Motors Corvette	910554 910553 910558 910557
Back-up right Back-up left		910427 910428
Ignition switch	Chevrolet	
Dimmer switch	Chevrolet	
Headlight switch	Chevrolet	
Accessory switches	Lucas or Micro-dot	

HARDWARE ITEM	MANUFACTURER	DESCRIPTION AND/OR MANUFACTURER'S PART #
Horn relay	Chevrolet	Delco 920-12V
Horn	Chevrolet	9000517
Windshield wiper assembly	Lucas	Austin-Healey, TR-3 XK-150, XK-140
Fuseblock	Chevrolet	Corvair, Chevrolet 1962 on
Air or heater ducts	EMPI	"Empivent"
FRONT WINDOW TRIM Windshield mldg.	Chevrolet 1965 Corvair	4489204 4489203 4469665 4469664 4489205 4474354 (12 needed)
Windshield clips		
REAR WINDOW TRIM Rubber molding Trim strips	Ford 1966 Mustang	C5ZZ-6342084A C5ZZ-6342404A-right C5ZZ-6342405A-left C5ZZ-6342430A-rt. upper C5ZZ-6342431A-lt. upper C5ZZ-6342084A
Rear trim clips (20-24 needed)		

FIBERFAB PRODUCT WARRANTY

Fiberfab products are guaranteed for a period of six months from the date of their delivery against defective material and/or workmanship. Fiberfab will replace or repair any part returned to our factory, or inspected in the field by an authorized representative of Fiberfab, and upon examination found to be defective. Before any merchandise is returned, however, the purchaser must obtain written authorization from the factory. Merchandise arriving without this authorization will immediately be returned to the purchaser at the purchaser's expense. In addition, transportation charges for parts returned under this warranty will be borne by the purchaser if the returned part proves to be not defective. Other equipment and/or accessories, not manufactured by Fiberfab but furnished with Fiberfab parts shall be subject to the guarantee as provided by the manufacturer of said equipment and/or accessories.

Except for this warranty, there are no other guarantees, warranties or representations expressed or implied. No person, firm, or corporation is authorized to assume for use any other liability in connection with the sale of our products.

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