

SUPPLEMENTARY INSTRUCTIONS
FOR INSTALLING
ROLL-UP, CURVED-GLASS SIDE-WINDOWS
IN THE FIBERFAB
VALKYRIE KIT
or
AVENGER

Page 43 of the Valkyrie Kit mounting instructions refers to the installation of Ford LTD curved-glass, roll-up windows. The following supplementary instructions complete the details of this installation and follow the techniques we have found most practical and least expensive in the construction of our factory-built Valkyries.

The Valkyrie side-window openings are designed to accept Ford Mustang (e.g., 1965 hardtop) vent windows and Ford LTD (e.g., 1966 4-door hardtop) curved-glass side windows. The door inner-panels are designed to accommodate the above mentioned windows and to support a roll-up mechanism--slightly-modified VW-Karman-Ghia (see PARTS LIST and text below for identification and parts numbers)--for raising and lowering the side windows with a standard crank.

Figure 1 shows the Valkyrie door inner panel (in this photo a right door panel is shown) with the hardware mounting holes labelled--the positions of these holes are cast into the panels as "dimples" in the fiberglass surface. Referring to the figure--the two "A" holes are used to mount the roll-up guide-track. The six "B" holes are used to mount the regulator (crank-up mechanism). The "C" holes (there are four) are drilled using the vent window frame as a guide (see subsequent figures). All holes are drilled with a 5/16" drill bit.

Figure 2 shows a stock (right) and modified roll-up guide-track and track-rider (the VW parts numbers are: 141-837-552B for a right door and 141-837-551B for a left door). The first step in modifying the guide track is to cut the top (the track riders are nearest the "tops" of the guide-tracks in Fig. 2) of the track at a 25-degree angle as shown in the figure. Then make a parallel cut 18" along the track. The extra slot in the track-rider is added subsequently.

Figure 3 shows the reverse side of the guide-tracks. Note that the bottom attachment-point must be moved up 4 3/8". To perform this repositioning drill out the attaching spot welds (obviously, this operation must be performed before the track is shortened to 18"), remove the attachment point and secure it in its new position--welding (as in the figure) or epoxy cement are appropriate for the fastening--screws or rivets should not be used because nothing should project on the other side of the track.

FIGURE 1

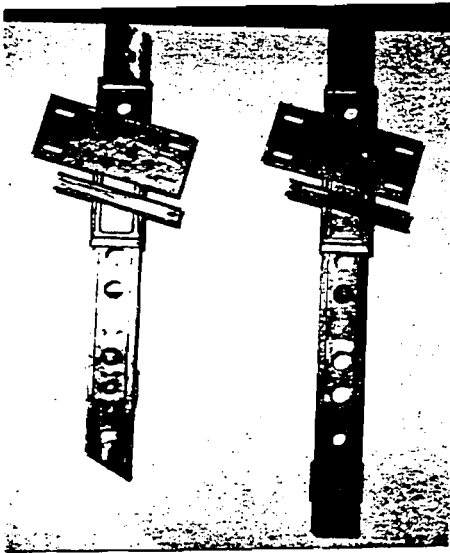
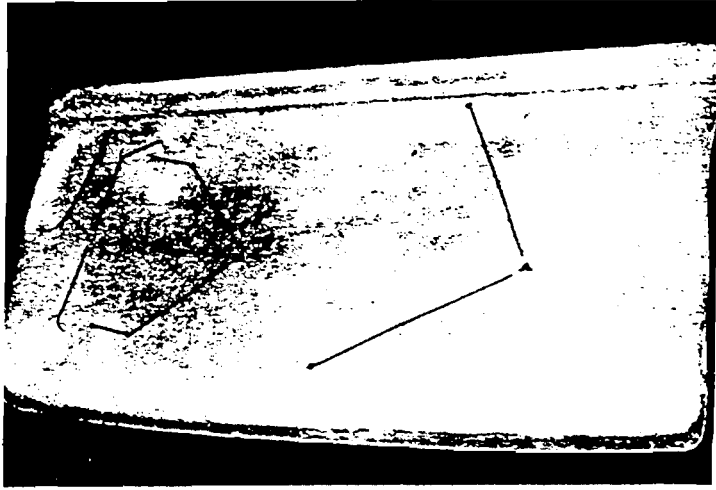


FIGURE 2

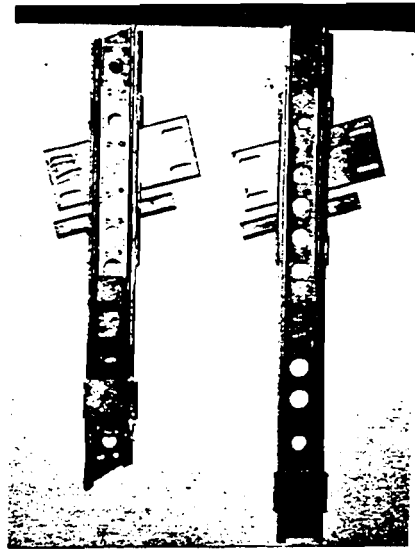


FIGURE 3

Figure 4 shows a stock (right) and modified regulator (the VW parts numbers are: 141-837-502A for a right door and 141-837-501A for a left door). To modify the regulator the L-shaped arm must be rotated 32-degrees clockwise as viewed in Figure 4. To move the arm, drill out the lower (in the figure) securing rivet and move the arm so that the rivet hole is positioned 2" away from its original position-- secure by welding or epoxy. Note also that the "up-travel stop" must be lengthened to 2 5/8".

FIGURE 4

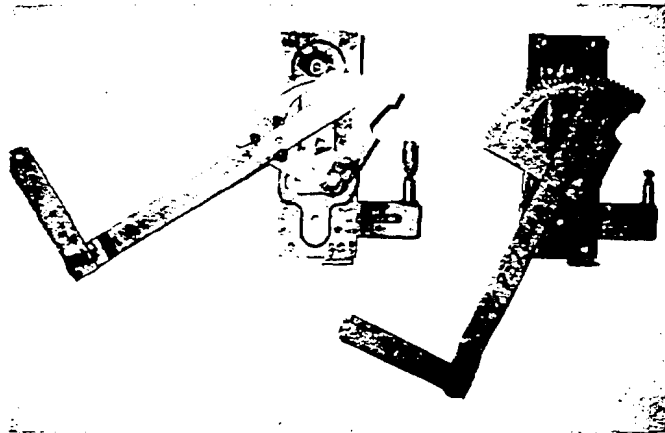


Figure 5 shows the LTD window glass installed in a VW glass-holder (part number 141-837-571A) using butyl tape (silicon rubber seal may also be utilized--see your local parts store for other window-affixing materials). The track-rider is attached to the glass-holder so that the rider is parallel with the front edge of the glass as shown in the figure. Use one original slotted hole and cut a second as in Figures 3, 4 and 5.

FIGURE 5

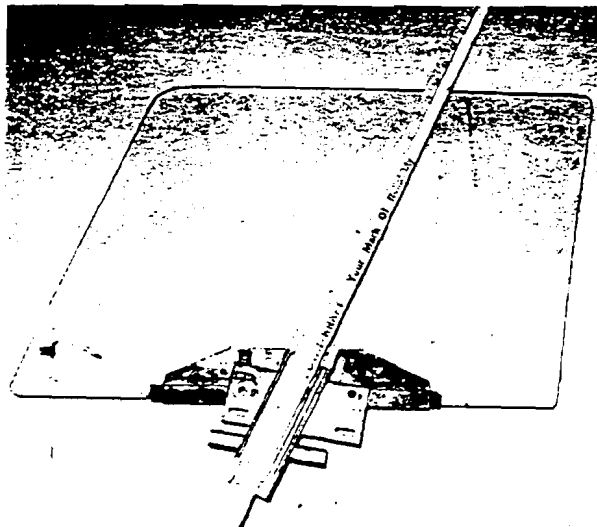


Figure 6 shows the roll-up guide-track and vent window assembly mounted on the inner-panel. Before mounting the vent window cut-off the window guide channel just below the lower attaching plate as in the figure. Also use Figure 7 as a full-size template to re-contour the top of the vent window frame to match contours of the Valkyrie window opening. Use a file or grinder to carefully remove metal from the frame. Referring again to Figure 6-- after the guide track and vent window are loosely bolted in place use a square to set the track and the channel parallel.

Finally, install the glass by bolting the glass holder to the track-rider--position the front edge of the glass firmly in the guide channel using the slotted adjustment holes in the track-rider. Now install the regulator by engaging the L-shaped arm in the track-rider and securing the crank assembly to the inner panel using six bolts (get the metric hardware you need at your VW dealer's parts department). The completed roll-up window assembly is shown in Figure 8 in the maximum "UP" position. Be sure to grease the track, crank-gear, etc. before installing the inner-panel, with mechanism attached, in the door--fasten the panel to the door with flat-head bolts at the top of the door, when nuts can be applied, and with #8 x 3/4" interior trim screws (with countersunk washers) along the sides and bottom of the door. Note also, in Figure 8, the application of weather stripping along the inside, top edge of the inner-panel--use small wood screws or epoxy cement.

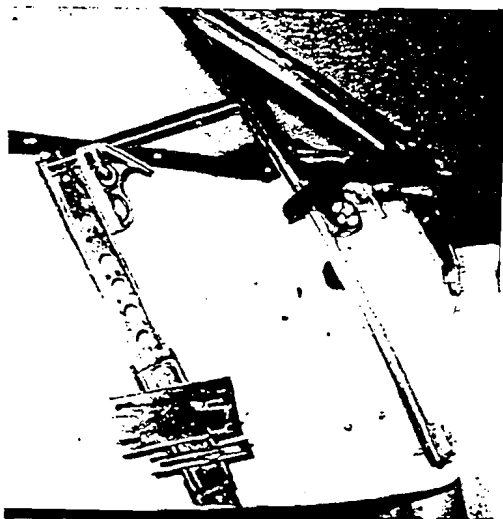


FIGURE 6

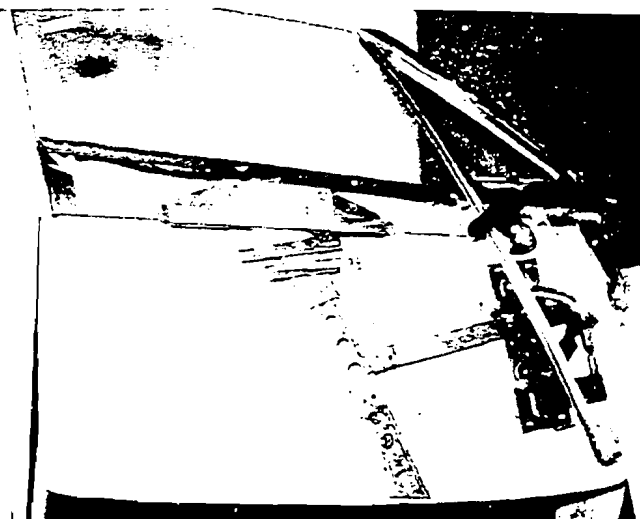
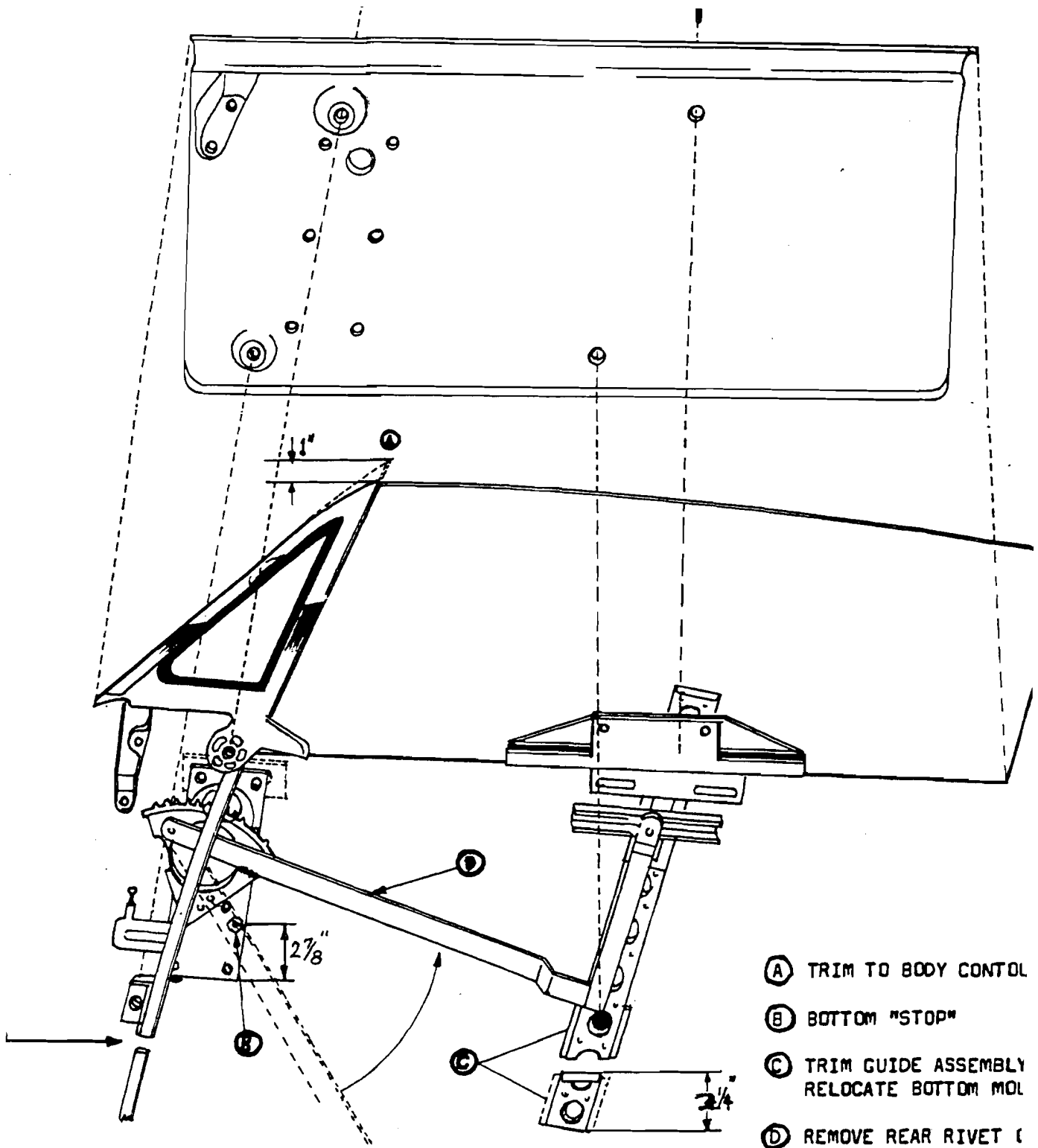


FIGURE 8



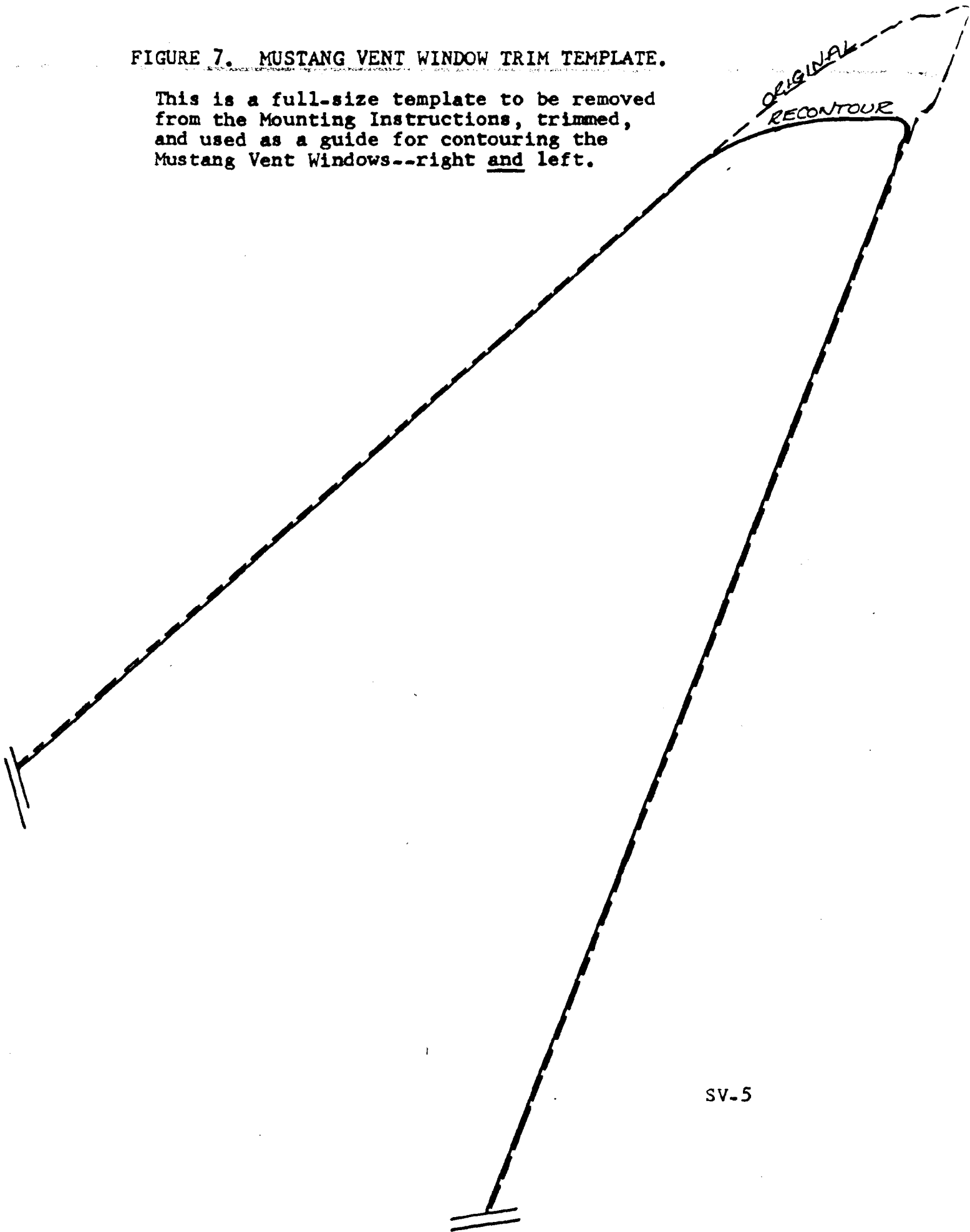
- (A) TRIM TO BODY CONTROL
- (B) BOTTOM "STOP"
- (C) TRIM GUIDE ASSEMBLY
RELOCATE BOTTOM MOL
- (D) REMOVE REAR RIVET (AND SWING ARM UP 2 (MEASURE FROM CENTE RIVET HOLE)
- (E) TRIM TO BRACKET

PARTS USED:

FIBERFAB DOORPANELS
 1965 MUSTANG WINDOWING - COMPLETE
 1965 FORD LTD FRONT DOOR WINDOW GLASS
 1960 OR LATER KARMANN GHIA WINDOW

FIGURE 7. MUSTANG VENT WINDOW TRIM TEMPLATE.

This is a full-size template to be removed from the Mounting Instructions, trimmed, and used as a guide for contouring the Mustang Vent Windows--right and left.

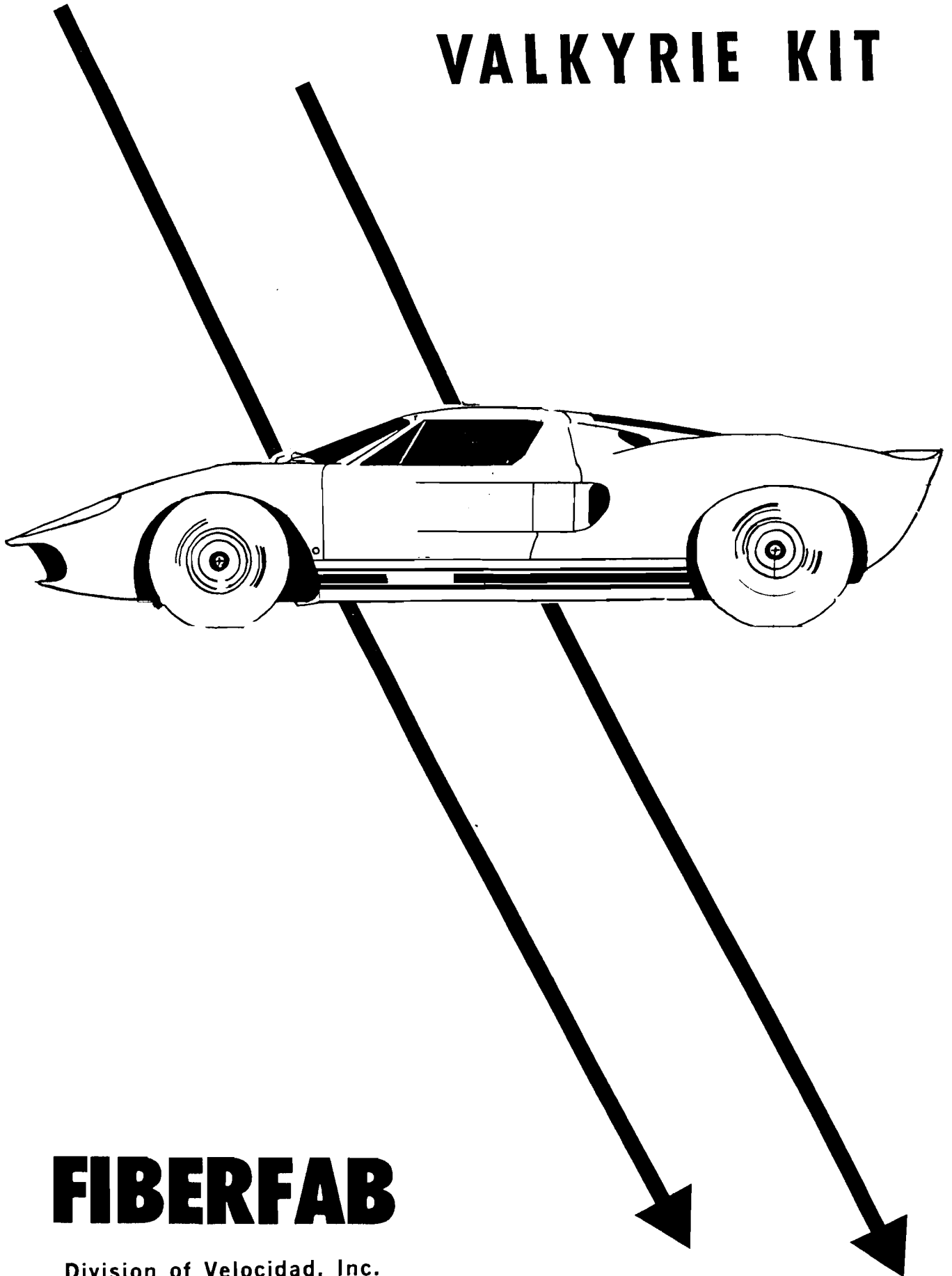


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RECOMMENDED PARTS LIST

DOOR/WINDOW HARDWARE		
Vent Window Assembly	Ford	1965 Hardtop Mustang Vent Window
Side Window Glass	Ford	1965 4-Door Hardtop LTD
Window Guide-Track	VW/Ghia	141-837-552B
		141-837-551B
Regulator	VW/Ghia	141-837-502A
		141-837-501A
Glass-Holder	VW/Ghia	141-837-571A
Arm Rest Base	Ford	C5ZZ-6524144-A
Arm Rest Pad	Ford	C5ZZ-6524100-AFA
Weatherstripping	Ford	C5ZZ-6551222-B
		C5ZZ-6551222-C
		C5ZZ-65513467-A
		C5ZZ-65513466-B
Door Lock Cylinder	Ford	C5OZ-6221984-A1
Door Latches	Ford	C4SZ-6321813-C
		C4SZ-6321812-C
Striker Studs	Ford	C2OB-6220008
		C2OB-6220009
Hinges	Ford	
RH Top		C5AZ-6222810-C
RH Bottom		C5AZ-6222811-B
LH Top		C5AZ-6222811-C
LH Bottom		C5AZ-6222801-B

VALKYRIE KIT



FIBERFAB

Division of Velocidad, Inc.

- 1/ GENERAL -- INTRODUCTION
- 2/ CONSTRUCTION MATERIALS
- 3/ ACQUIRING COMPONENTS
 - a. Corvair front suspension and steering assembly
 - b. Corvair transaxle
 - c. V-8 engine and bellhousing
 - d. Other major mechanical components
- 4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT
- 5/ INSTALLING THE FRONT SUSPENSION
- 6/ INSTALLING THE ENGINE/TRANSAXLE/REAR SUSPENSION
- 7/ COMPLETING THE CHASSIS PREPARATION
 - a. Hydraulic system
 - b. Fuel system
 - c. Shift linkage
 - d. Cooling system
- 8/ MOUNTING THE BODY
- 9/ MOUNTING ELECTRICAL COMPONENTS -- WIRING
- 10/ INSTALLING WINDOWS AND DOORS
- 11/ FINISHING THE INTERIOR -- UPHOLSTERY
- 12/ FINISHING THE EXTERIOR -- PAINTING

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-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, i.e., 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 compone in excess of the purchase price of the Valkyrie Kit.

Figure 1 shows an overall view of all the components in th 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 leng and diameter between the Corvair standard transmission input sh 25" long and the special Fiberfab shaft shown. By eliminating need for the long, flexible standard shaft, Fiberfab's adaptati of the Corvair transaxle is capable of handling significantly m 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

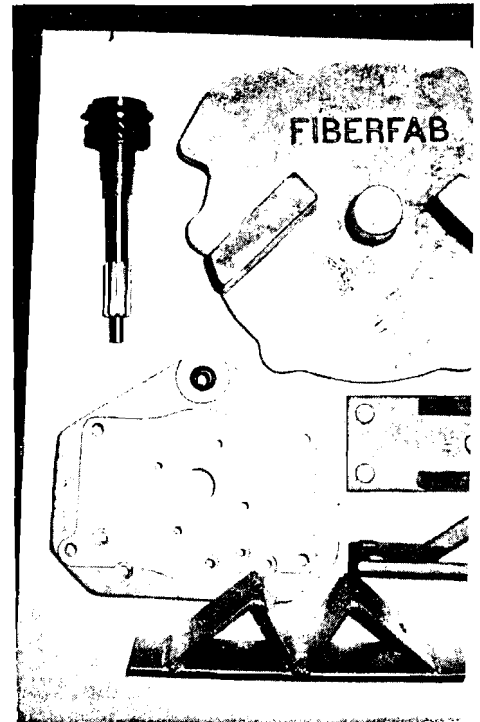


FIGURE 2

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-riquet" 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. Corvaire transaxle/rear suspension
2. V-8 engine
3. Corvaire front suspension

An exact description of these component groups is given below.

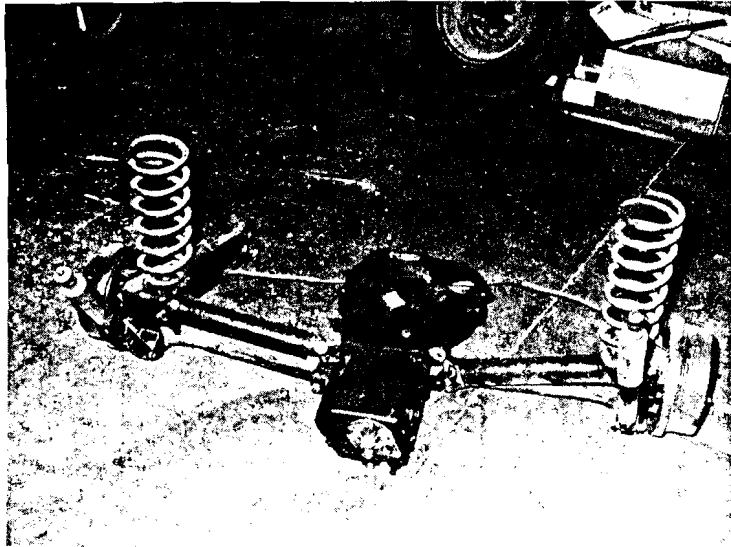
CORVAIRE TRANSAXLE/REAR SUSPENSION

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 carrier hub assemblies
8. Two wheel/brake assemblies
9. Two coil springs

These components (as pictured in Figure 3) comprise the total 1965 Corvaire 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 CORVAIRE 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.

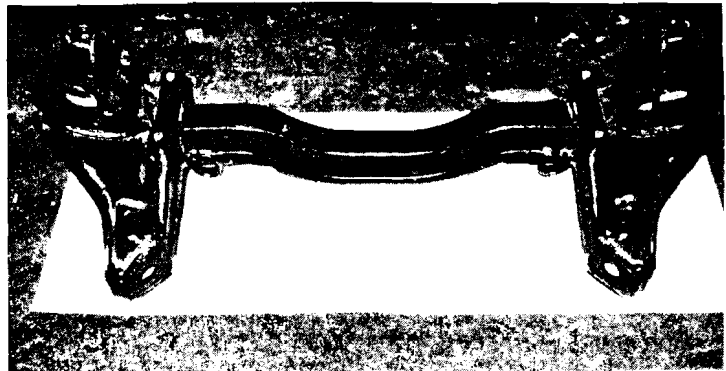


FIGURE 4 - Corvair Front Suspension

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 27-1/2" (+-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 34-5/8" (+-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.

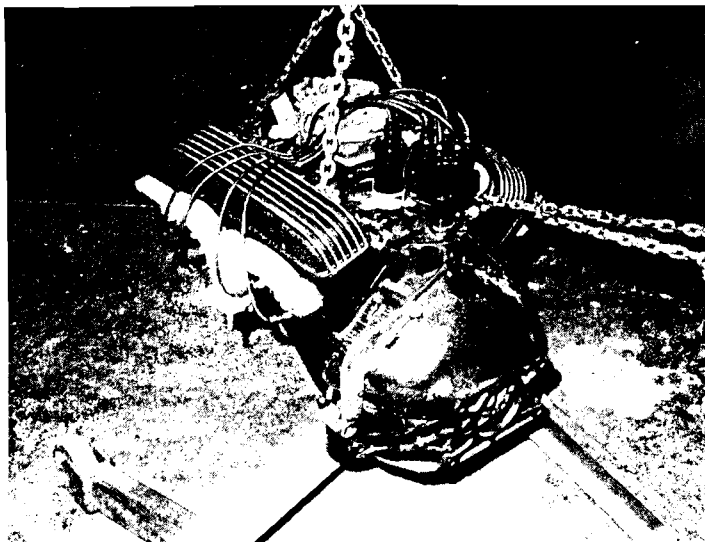


FIGURE 5
A Typical Chevrolet
327 CID V-8 Engine
With Bellhousing

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 bellhousing)

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:

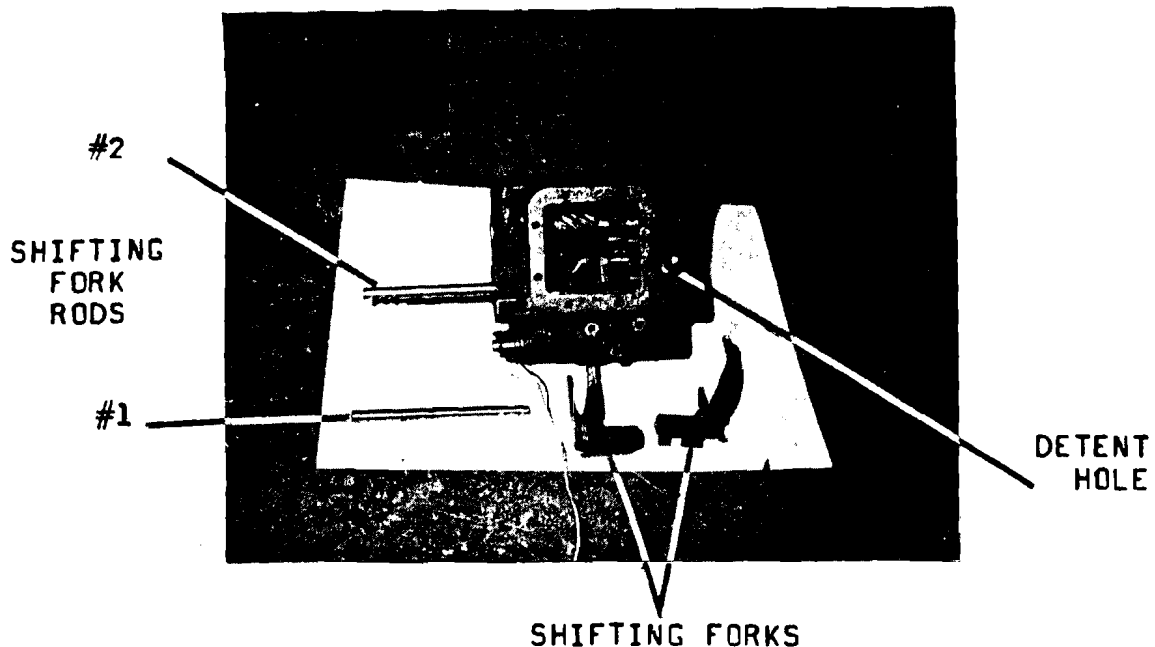
1. Preparation of the engine
2. Installation of the Fiberfab drive-shaft
3. Preparation of the rear hanger-plate
4. Assembly of the engine/gear box/differential into a single unit

ENGINE PREPARATION

Assuming that you have the engine ready-to-go, ie., the engine itself is prepared to your satisfaction -- all "hop-up" and/o "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 5

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).

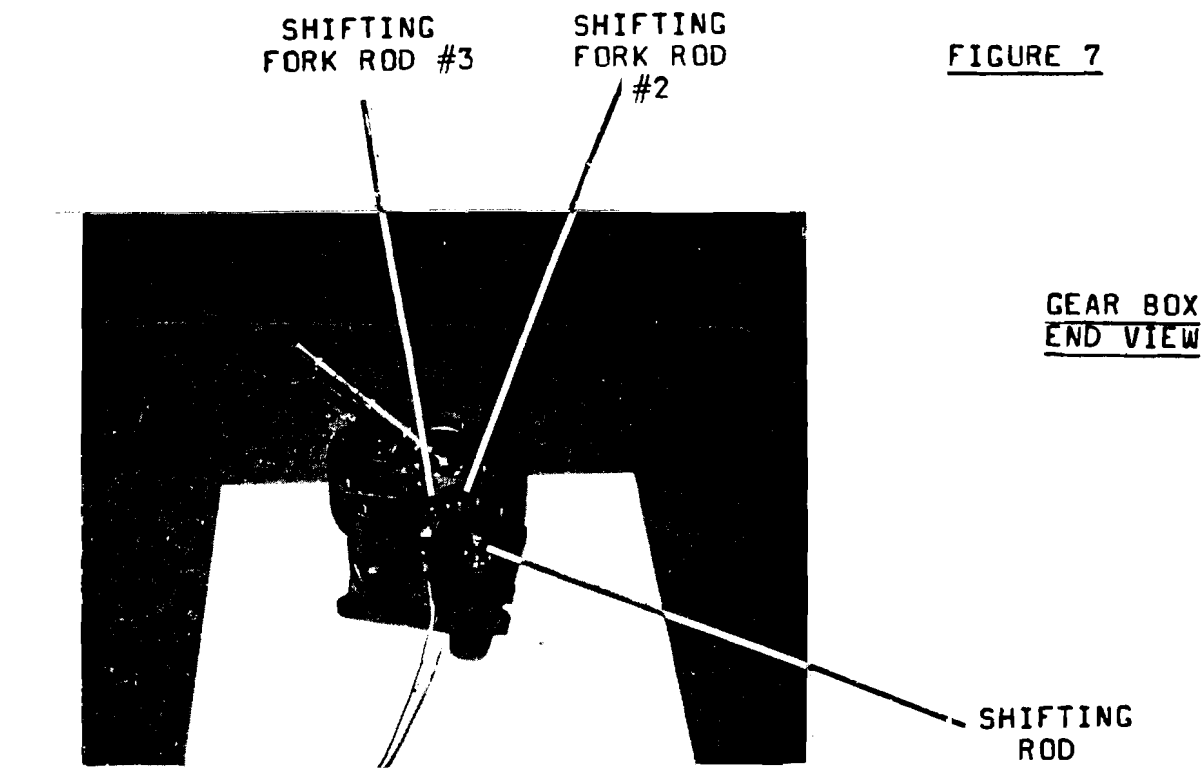
4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

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).

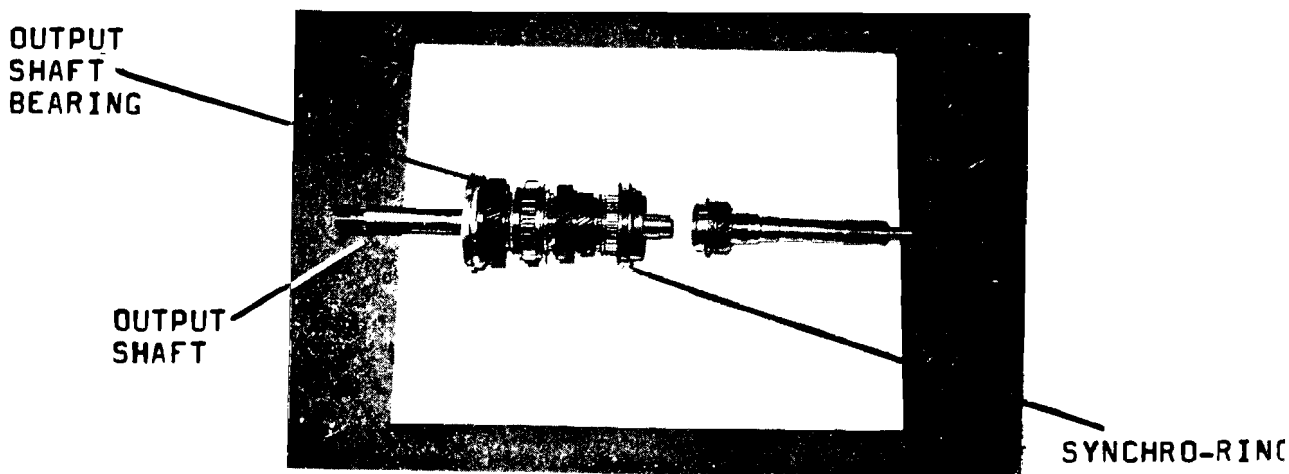
4. Drive out the roll-pins which secure the shifting forks to the shifting fork rods -- if the pins fall into the case, they can be retrieved subsequently.
5. Remove the plug from the detent hole (see Figure 6) and extract the detent and spring noting the order in which they are removed.



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

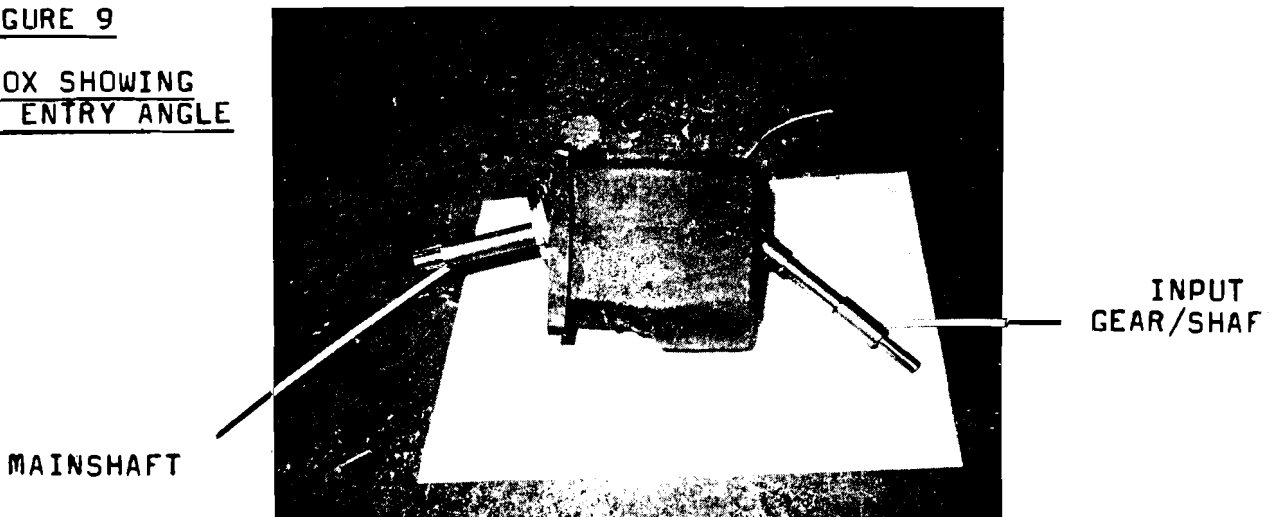


4/ ASSEMBLING THE ENGINE/TRANSAXLE UNIT

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 "∩"-shaped rear support is bolted to the rubber mounts.

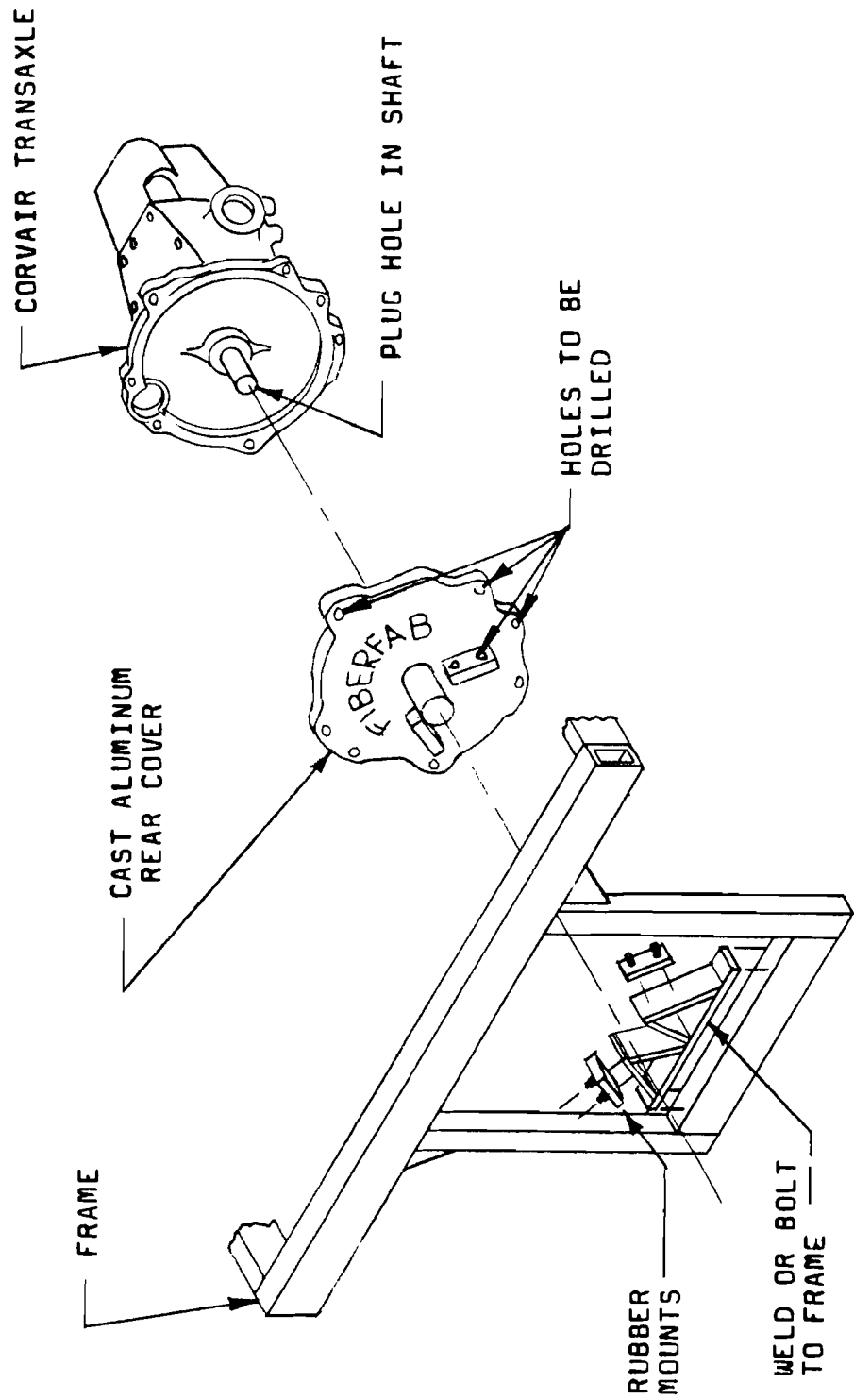
The tasks involved in preparing and mounting the rear hanger plate are summarized pictorially in Figure 10. Note that the rear support is not welded or bolted to the frame until the entire drive-train is in position.

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 T89B-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

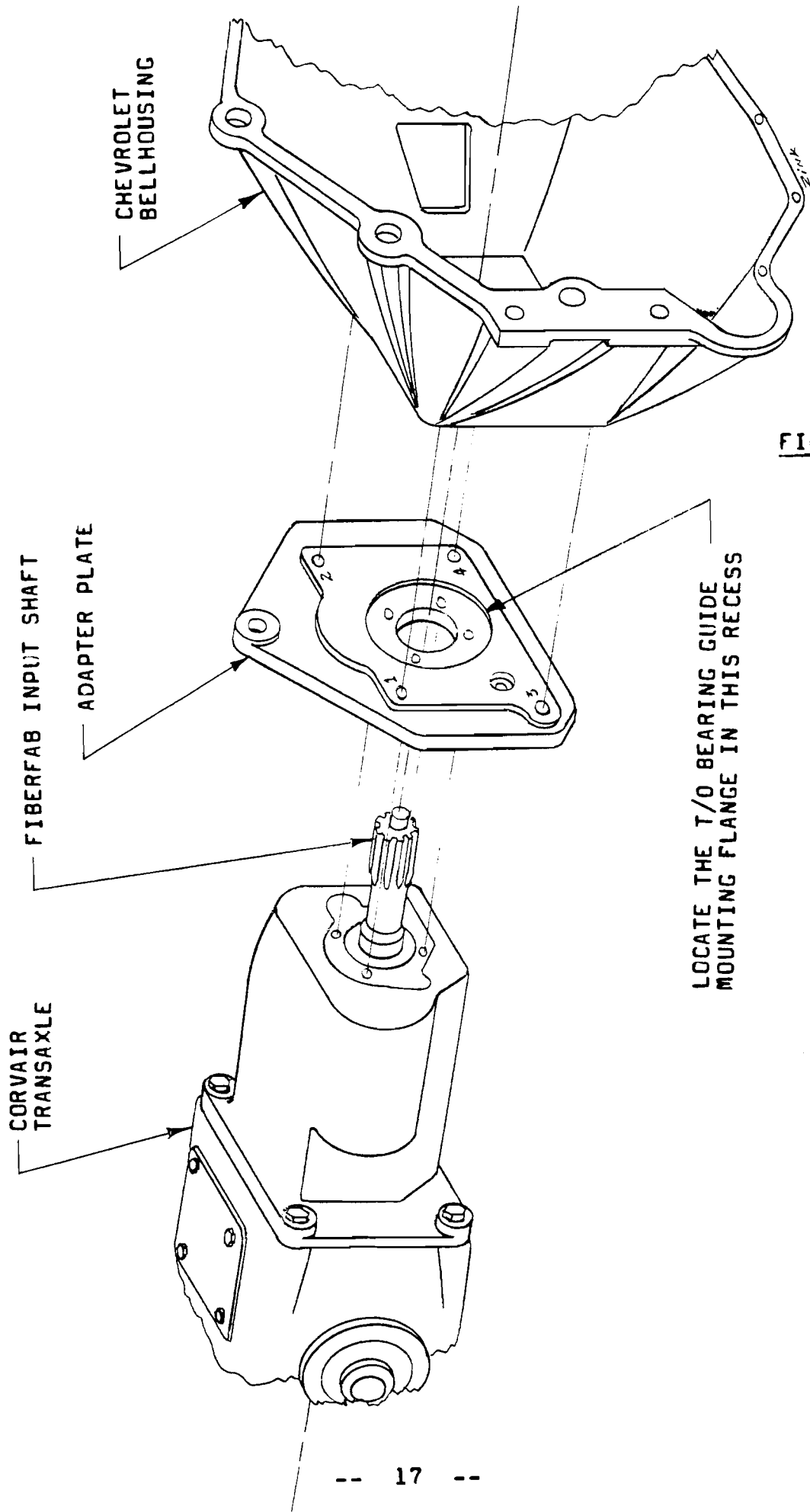


FIGURE 11

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 3/8" diameter and 5-1/2" 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 cross-member (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; i.e., 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).

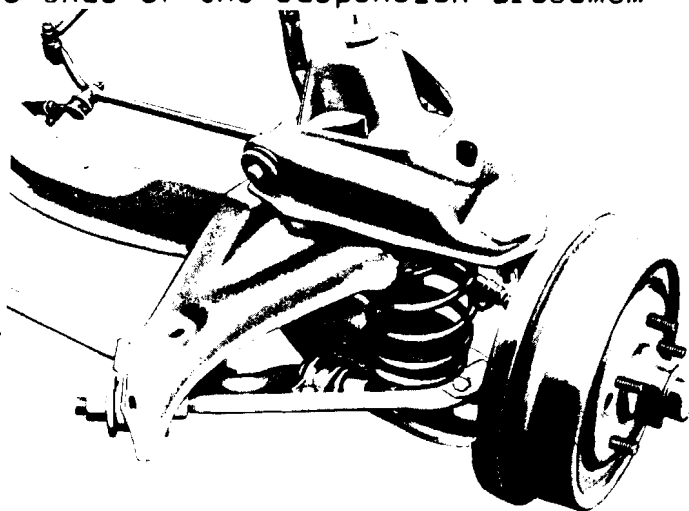


FIGURE 12

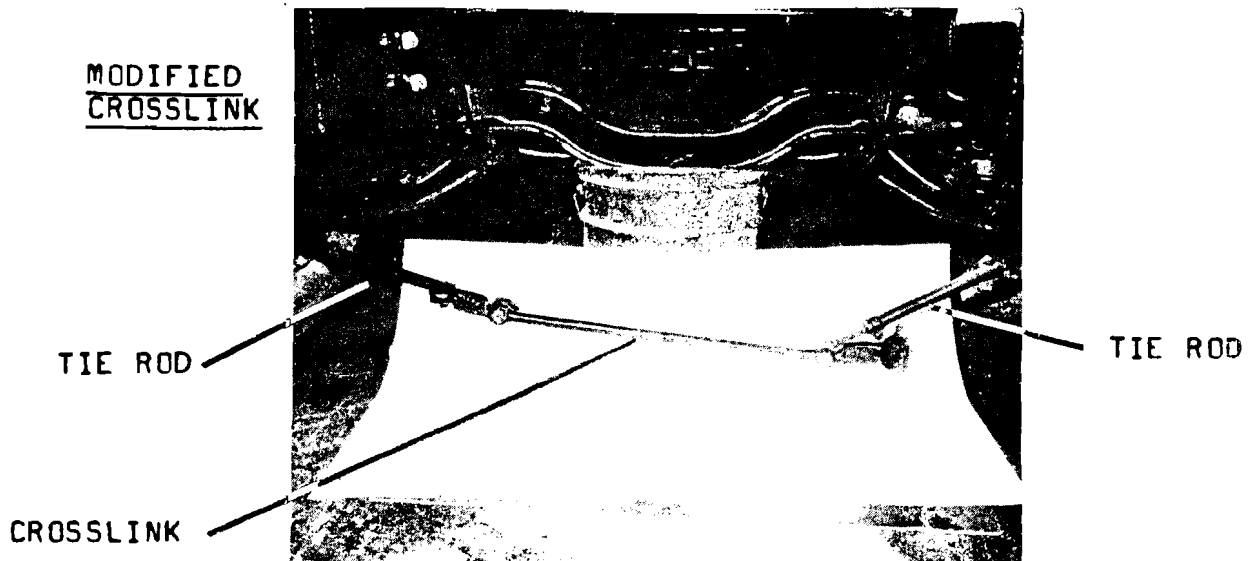
FRONT SUSPENSION ASSEMBLY

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 1-1/2" x 1-1/2" x 5" x 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 24-1/2" (center-to-center between the idler arm and pitman arm pickup points, as shown in Figure 13).

5/ INSTALLING THE FRONT SUSPENSION

FIGURE 13

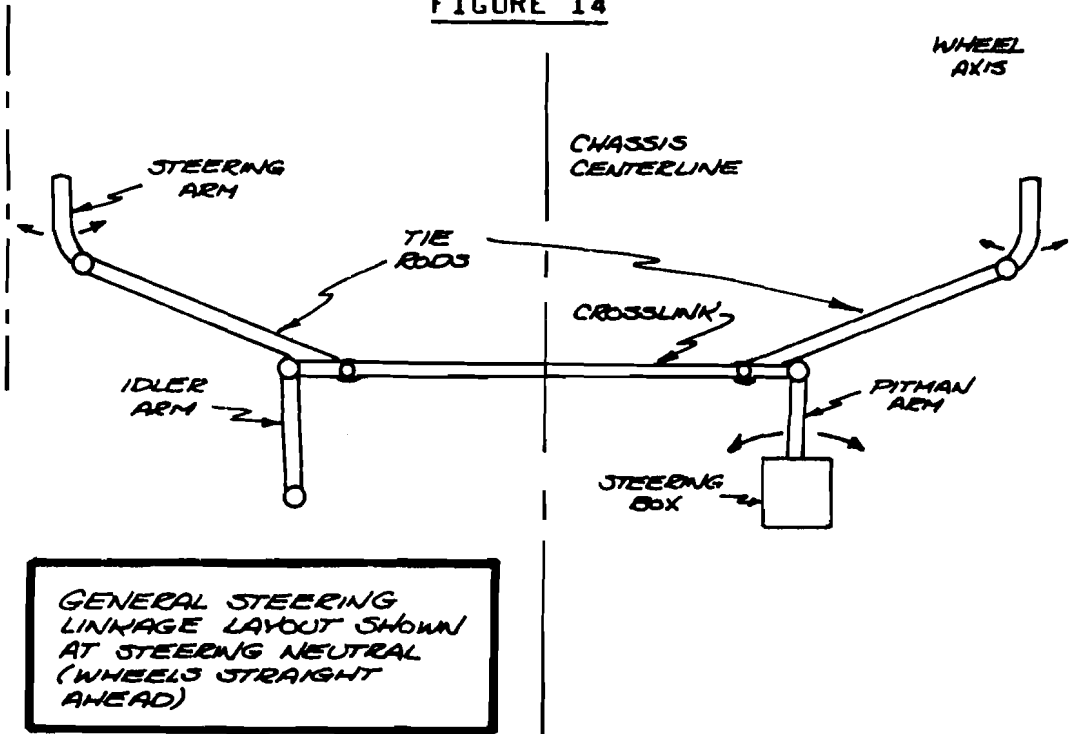


The shortening is best accomplished by cutting and welding with low-hydrogen rod. When the crosslink is cut and rewelded, perfect alignment is essential.

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.

