

The Corvair Steering system – Steering Box to Steering Wheel

All stock Corvair cars used a similar steering setup. There were changes in individual components over the years as the body style and safety rules changes. We will review the stock items, covering all the parts from the steering arms up to the steering wheel. Major items first.

Steering Gearboxes

There were some unique early 1960 steering parts, it was the beginning and several running changes were made. For the purposes of this document, all 60-63 steering gears are interchangeable. No Corvair box was used on any other GM automobile.

(Design #1) This design used a steering gear with a short, fully splined input shaft. The spline is a 5/8" x 36. There is a dual input splined coupler, (with two bolts), installed a bit more of an inch out of the box. The end of the steering column shaft slides into and is bolted into the coupler, creating a solid shaft from the box to the steering wheel. The steering column shaft is a unique item. It tapers down from 3/4" diameter inside the column to the 5/8" before entering the coupler. Like the steering box input shaft, the column shaft is fully splined at the tip. This means the column and/or wheel may be removed for alignment. It also means the column can be installed with the wheel in other than straight ahead position, so be careful.

(Design #2) For 1964 Chevy changed the design of the column assembly to make the steering shaft part of the actual steering gear internals. The coupler was removed, and the steering shaft was no longer tapered, it is 5/8" outside diameter all the way from inside the box to the steering wheel. The steering box material was changed from Aluminum to cast steel. This re-design still used the same bearings and seals. And the Pitman arm is the same design. (There was a slight change in the actual pitman gear.) But since the shaft was now 5/8" all the way up to the steering wheel, GM could not use the same steering wheel spline inside the car. The actual spline was bigger than 5/8" and would not fit through the top of the steering box. So they changed all of the steering wheels to a new smaller spline. The 1964 system is unique, it uses the smaller spline like the 65-66 but the same turn canceling cam set-up as the earlier models.

(Design #3) For 1965, along with the external body/suspension changes, the dash and the steering wheel location changed, too. The wheel and the standard column were both changed. Since the wheel was deeper and the actual dashboard of the car was redesigned to taper down underneath, the actual column shaft (still the same one-piece design as the 64), was now one inch shorter. The turn signal assembly changed considerably as well. But the same small steering wheel spline was retained and used through 1966. Once removed from the car – it does just slide out of the bottom of the steering column after the steering wheel is pulled. Once removed it is hard to tell the difference between the 64 and the 65 standard steering boxes.

(Design #4) A new optional telescoping steering column dictates a special steering box for early 1965 cars so equipped. A coupler, similar in concept to the 60-63 design, now mated the telescoping column shaft, splined at the tip as the 60-63 before, with a fourth steering box design, with an input shaft longer than the 60-63, but shorter than the standard column shaft. In this case both the box input shaft and the column splined tip had a machined flat onto one edge

of the spline. This dictated that the assembly could only go together in that one position. This 1965 telescoping column steering box is unique and was only used in this application.

(Design #5) In mid-1965, when Chevy added this new stamped coupler and the retained shaft column, they changed the standard steering gear again. They lengthened the input shaft about 1". The tip looks exactly the same, with a 5/8" shaft and a 5/8" – 36 spline and a machined flat like the 65 tele box, but the input shaft is one inch longer. It sticks out of the box 15.25 inches. At the same time in 1965, Chevy released a quick ratio steering option (N44). That option included both a faster turning ratio box and slightly shorter steering arms.

(Design #6). The quick ratio late-65 through 1966 box makes this box unique. There is no external identification of the quicker ratio box. When describing "boxes" as "X" turns "lock-to-lock", the box must be checked with the pitman arm not connected. If it is still installed, the steering arms may be the end-point restrictions on travel, giving misleading readings. The factory quicker boxes are just a bit more than 3.5" turns lock to lock. All standard boxes are over 5 turns. There are 4 different parts of the box that are unique to the faster ratio box.

Design #7) In 1967, Chevy met the GM commitment to the collapsible steering column by installing the new design into the Corvair. To do this, they moved the stamped steel coupler down closer to the steering box. This changed the box input shaft length again, back to where it had been in 1960-63. For the 67-69 boxes, they added the machined flat on the input spline. (as on the 1966.)

(Design #8) This is the new design, 1967-69 style, faster ratio box. The 1967-69 box will swap directly into the 60-63 Corvair as well.

This completes the designs used in the Corvair. Note – I have heard anecdotal evidence of a quicker ratio long-shaft 1965 box. I have never seen one and the parts book doesn't call out parts for it.

Aftermarket Steering Gearboxes

About 12 years ago, the quick GM boxes started reaching strange (high) prices, the laws of supply and demand being applied. Flaming River sold a quick ratio steering box and a couple of hundred were made and sold. They were made as a duplicate of the 60-63 boxes (but not in aluminum). They are no longer in production.

Over the years, several companies have sold a reversed Corvair box, in a standard ratio, for used in street rods. For a while, people were buying them, turning them back to the original design and installing them in Corvair. Nobody has sold a quick ratio reversed box. New products are on the horizon.

Steering Arms

Again some early 1960 arms are said to be different, but aside from those, all Corvairs can use the same arms. They were machined from steel forgings. There were different early and late arms advertised, but they seem to totally interchange. It may be a part number only change. All of the standard factory arms were the same size and geometry. All models used the same arms as

standard. In late 1965, Chevy brought out the special steering option referenced above. That option included a faster ratio steering box and a pair of shorter steering arms. These fast arms were also machined from steel forgings. They were not offered by themselves on any Corvair model, only with the faster box, as part of the “package”. Of course, they could have been ordered from a dealer and installed on any Corvair car.

Aftermarket Steering Arms.

In 1960, when Chevy brought out the Corvair, one of the selling points was easy steering. The stated goal was to feel like a 1959 Impala with power steering. For regular driving the slow steering of the original Corvair was fine. As soon as the more "enthusiastic crowd" started driving the "Poor Man's Porsche" the complaints about slow steering started. I heard it referred to "like winding an alarm clock" (that is a reference for really old people, like me). Several of the Corvair enthusiast suppliers (IECO, Fitch, EELCO, others) invested in making steering arms with a shorter distance out to the tie-rod attachment point. Not all the engineering was completed and there were - and are - issues with the shorter arms. Yes, the tires/wheels turn a certain number of degrees with less steering wheel input. But the wheels do not turn as far at full box travel, which increases the turning circle. Depending on the actual arm tip location, they can cause poor Ackermann response (look it up on the Wiki) But the shorter arms had a great advantage, they were cheap and easy to install. (They did require a toe adjustment to return the wheels to straight ahead.) They only added a little bit of extra steering effort, so they were quite popular. Worth noting that the traction of the original narrow, hard tires installed on the Corvair did not require a lot of “power” steering to overcome. Newer, wider, sticky tires will require more effort.

I installed a pair of the shorter aftermarket arms on my 65 Corsa Convertible, about three weeks after I bought it in 1967. Since I was doing gimmick rallying a lot, (city streets) I really noticed the turning circle issue. Skip forward a few years (for me, in and out of the Army) I found out about the "Quick-steering option" added late in the 1965 model year. This was Chevrolet's response to the original slow steering. They replaced a few parts inside the box and built a shorter pair of steering arms. Together they vastly improved the steering. I suppose those factory arms have a little of the same issues as the aftermarket ones, but no way near as bad, because they had the box doing most of the work. In 1970, after buying my next Corvair (another 65), I went to my Chevy dealer and ordered a new box (\$70 at the time) and adapted it into my 65 with the tele-column. At the time, all the parts guys knew about was the faster box. I autocrossed it with the fast box and the short aftermarket arms. A few years later, I went road racing with another car, using a fast box and a “found” set of the factory arms.

Currently – as of late 2019 – A new design steering arm pair is being offered on the market. These are manufactured from thick steel stock formed to provide the correct position for the tie-rod end. I have seen pictures of these, but I haven't used them or installed them. Clarks still has the shorter cast arms available. There are, supposedly, shops that will cut the stock forged arms and shorten them. If you do this, be sure to adequately check the welded areas for any cracking.

Steering Columns

The steering column housing for the early-model Corvairs (60-64) was a complex weldment. Besides the main tube with the bearings for the steering shaft, a mounting bracket for the parking brake was welded on and a few other items mount as well. With the internal shaft firmly connected to the splined shaft at the steering gear, the housing floated over the shaft.

Design #1 - The 60-63 column steel shaft was $\frac{3}{4}$ " diameter up at the column, then tapering to $\frac{5}{8}$ " down at the steering gear. The spline at the top of the column for the steering wheel is common to almost every other General motors steering column since the 1950's (GM finally changed to a "metric" spline on all their cars in the late 1990's.) The 60-64 turn signal design was unique to the Corvair, when it came out, and the canceling cam bolted up under the rear face of the wheel. Both metal and plastic canceling cams were used.

Design #2 - Minor changes to the actual column. The center shaft design was now a $\frac{5}{8}$ " shaft, all the way from the box to the steering wheel, almost 4 feet long. Usually they added a plastic bushing, at least at the top, to center the shaft in the upper bushing and stabilize the steering wheel. A correct bearing assembly could also be used here.

Design #3 - 1965 through mid-April 1965. Standard column. The 65 Corvair used a completely new column housing design, including a self-contained turn canceling switch. Two carry-over things from 1964. The new column still floated over the long-style steering box input shaft and the small sized splined for the steering wheel was still used. The column was deeper. With the shaft further away the steering wheel was deepened as well. Since the column floated on the shaft, it had some adjustability built into it. At the firewall, the three-bolt mount flange clamped over the 1.5" diameter housing, once it was in position. The mounts on the underside of the dash have slots on either side to allow in/out movement to adjust the column to the wheel. Once done, the lower clamp locks it in place. The three bolts at the lower flange bolt into three nuts that are welded to the front side of the firewall sheet metal. All 65 canceling cams snapped into the lower side of the steering wheel with three little tabs. The 65 used a small nylon bushing that dropped into the upper bearing inner race, to center the smaller shaft.

Design #4 - 1965 through mid-April 1965 – Telescoping column with two-spoke plastic wood wheel. For 1965 Chevy added a telescoping steering column option and used it only on the Corvair and Corvette. (The Corvette used a 3-spoke wheel design.) The first design (#4) used a lower tip with the same $\frac{5}{8}$ "-36 spline used on the steering box, and a solid coupler design. The mounting of this column was the same as the non-tele early-65 column. The lower shaft diameter was $\frac{5}{8}$ " all the out of the bottom of the column housing. The tele-mechanism at the top was complex. Most parts are available, likely because of the Corvette commonality. Look for an exploded view to locate all the items correctly. At this end of the column, the 65 and 66 tele mechanisms are virtually identical.

Design #5 – Mid-April 1965 through end of 1966 model year. Standard column. – The Corvair is a "front-steer" car. This means that the steering arms point forward of the front wheel hub assemblies and the steering gear, the tie rods and the idler are located forward of the front wheel centerline. Perhaps Chevy safety engineers finally recognized that adding some type of

deflecting joint in the system would decrease the likelihood of the shaft striking the driver in the chest in a front-end accident. So, late in the 65 model year, Chevy fundamentally changed the design of the column. The early columns had “floated” over the steering shaft. Their location was dictated by the location of the steering wheel which was positioned by the column shaft tip. The column was adjusted (in-out) to match the bottom of the fixed steering wheel. The major difference in these columns were that the column housing no longer “floated” over the steering shaft. The shaft was restrained in the column. The new design – implemented in April-May of 1965 and used until the end of the 1966 model year – retained the upper steering shaft at both ends of the column. A spring-loaded clamp at the bottom and a snap-in clip at the top. The snap-in clip is hard to see, even with the wheel removed. The spring loading at the bottom pulls the clip downward against the upper housing bearing. It also makes it hard to remove, especially in the car. Trust me, the clip is there. The dash electrical terminals are the same. Many of the parts of these Design #5 columns were identical to the Design #4 column. The later design added two methods of keeping the column and steering wheel out of the drivers chest. The new coupler, mounted on the upper-most part of the steering input shaft, allowed not only for slight misalignment during assembly, it was designed to lean sideways in a crash and not transmit crash damage directly up. The firewall mount for the column was also designed to prevent movement. The large mounting plate on the front side of the firewall was there to intercept and stop the coupler from intruding into the passenger compartment in an accident. An exploded view of the coupler assembly, in both the 66-up shop manuals and Clarks catalog, will show you the correct assembly of the assembly. For the Design #5 column, Chevy changed back to a $\frac{3}{4}$ ” shaft for the steering column, but retained the small spline for the steering wheel, perhaps to use the same 1965 wheels again in 1966. The front tip of the shaft was prepared for the coupler by drilling a hole, crossways, through the $\frac{3}{4}$ ” shaft and pressing in a pin to accept the coupler parts. See the exploded view. The pin is pressed in and, if required, can be pressed back out, and back in again. It is a tight fit. If you plan on re-using the pin, do not use a hammer to remove it.

Design #6 1967 brought GM’s Commitment to safety and the installation of a collapsible Steering column. Saginaw Steering Division developed this system and it was delivered for all GM cars in 1967. It was installed in every 1967 Corvair. In order to provide enough space for the collapsible column in the Corvair, the couple was moved down to the steering gear. The 1967-69 steering gears had a short input shaft. The coupler was almost exactly like the 66. In 1968, GM added a coil spring inside the coupler. (no idea why). The 67-up columns were different from the earlier units. The turn signal switches were different, two different brands were used. The mountings under the dash changed to a specific set-up for the collapsible section. The flange at the firewall changed as well, but is close to the 66 design. To allow clearance over the top of the new column, the spacing at the dash face changed, and the pedal assembly for manual transmissions had to be changed for added clearance. The late peddle/clutch cable parts will move into the 65-66 body “as a whole”. There are people who have done this swap so reach out for help. There are also some electrical wiring changes, since the 67-up columns had a 4-way flasher built into the column. And GM changed to a standard wiring color and plugs across the different product lines in that time frame. When they standardized the column design across the product lines they “re-standardized” the steering wheel mounting spline. All the 67-later Corvair columns used the same steering wheel spline and mounting as the 67 Camaro. It is the same

spline that Chevy used on the 1960-63 Corvair – but other things were quite different, specifically turn canceling.

Design #7 – This is the rare-bird telescoping column for use where the collapsible column was required, so it was used from 1967-69. The wood wheel dropped out of production but, by then was a rarely supplied item. For the purposes of swapping, it is the same as the non-telescoping 67-69. There were some minor changes in the internal mechanisms during the 67-69 years.

Steering Wheels and Hubs

1960 to 1963 steering wheels were pretty standard, 2-spoke hard rubber/plastic, painted wheels. All used the same larger GM center spline. All were 16” in diameter. There were several styles and many colors, but all were similar. The wheels were not as “deep” as the 65-later wheels.

In 1964, the standard wheels were similar to the earlier ones, but they now used the smaller spline to match the new one-piece steering shaft. The standard 64 wheel used the same canceling mechanism and horn system as the earlier models.

1964 also saw the release of a new “plastic wood” wheel, option N34. This new wheel had two stainless steel spokes, a wood grain plastic outer rim and a specific mounting hub, still with a small spline. The wheel mounted with 6 screws, the horn switch was unique to the sport wheel installation, with a specific snap-in horn button. The horn button was also used on the 1964 Chevelle.

In 1965, the body dashboard mounting was redesigned and the steering wheels were changed, though still a two-spoke design. The new turn-canceling mechanism required changes to the bottom side of the new, deeper, steering wheels. The turn-signal canceling cam now snapped into the bottom of the wheel. These three mounting tips can break off easily.

1965 also continued the Sport Wheel N34 option. The same wheel used in 1964 was now riveted to a special stamped steel 3-piece hub. A slightly different horn switch and a 1965 specific horn button were used. Again, the horn button was also used on the 1965 Chevelle.

New, for 1965, was the telescopic column option N36. The tele-column used the same wheel as the sport wheel option, but everything else at the top of the column was shared with the 1965 Corvette tele-option. (The Corvette used a slightly different 3-spoke wheel). The telescopic wheel design used the larger spline

The 1966 models shared all of the 1965 wheels. Slightly different horn buttons were used on some models. For 1966, Chevy added a lower cost telescoping wheel option. They replaced the “wood” wheel and hub with a different one-piece plastic/hard rubber wheel. Some of the adjustment parts from the wood version carry over, some do not.

The 1967 wheels are easy to spot. They all use 3-spokes. Since GM went back to the larger spline in 1967, with the collapsible column, the 67 wheels only fit the 67-69. The much lower sales of the 67 and later cars made a couple of wheel options very rare. The tele option

continued, and, I believe the low-cost plastic wheel version as well. Basically the 67-later steering wheels were the same as Camaro wheels.

As noted, the 1964 and later Corvair models had a plastic wood, sport-wheel option. This optional wheel attached to a center hub. Corvettes had used a similar option for several years. From 1963-on, including all Corvairs, until the release of air-bag wheels, GM used one bolt pattern for all of their 6-bolt sport wheels. It is 2.75" circle, in diameter. Corvair, Corvette, Oldsmobile, Buick, all used the same pattern, including the 65-66 Telescoping wood wheel option. The pattern was oriented with a pair of the bolts located 30 degrees to the left and right of the top center, and other wheels at the continuing 60 degree spacing. The design used six tapered seat screws to attach the wheel for cast hubs. Sometimes the wheels were attached with tapered head rivets. The 65-66 Corvair sport wheel was this design, likely used because the hub was not a casting, but was assembled from stamped steel parts. Not enough material to thread the base metal. The sport wheel pattern also included a small three-bolt pattern for the horn-switch. The horn switch has three legs that act as a ground for the horn. The ground circuit is fed up through the hub adapter via either a metal leg contacting a spring-loaded pass through, or a wire with a spade-lug terminal attached. The factory horn button snaps into the switch. After installation, the horn button is suspended by the switch. When the button is pushed down, the outer portion deflects the mount underneath, grounding the button and honking the horn.



GM Pattern 2.75"



Horn Switch

After 1966 GM changed from two spokes to three spokes on almost all of their steering wheels. On the Corvair, and on the Chevelle and new Camaro, they used the third spoke at the bottom. New safety requirements for 1967 had added the collapsible column. On many models, the lower spoke was not part of the main stamping, it was a separate piece that mounted beneath the main wheel stamping, riveted or welded into place. Perhaps this design would allow better energy absorption if the driver hit the wheel in a crash. The added spoke resulted in a change of the face of the hub. The lower center portion was dropped to allow the spoke to seat properly. The lower two screws in the hold-down pattern pass through this spoke.

Replacement Parts and Interchangeability

With a couple of exceptions, replacing the steering wheel on the Corvair car usually involves replacing the steering wheel hub. Some year models are interchangeable, but not many. Since the bolt pattern used with the "woodish" Sport Wheel option and the telescoping column is the same as other GM models, sporty wheels from many other GM models (from the mid-60s)

will bolt on. Buick and Oldsmobile had some 3 and 4-spoke models that will fit. These will bolt onto the Corvair hubs, at least for 64-66. The 65-66 sport hubs had the original wheel riveted on. If the rivets are removed and nuts/bolts substituted, care must be taken during re-assembly to minimize run out of the outer shell. Otherwise the shell will scrape on the steering column bell. I can personally confirm this. Some of the 67 Hubs used that “dropped lower spoke” design, as do many replacement hubs. If you have a flat bottom wheel, there are small fill-ins available to flatten out the top. Also if you have a dropped spoke design wheel, but a flat adapter, there are larger fill-ins to adjust the wheel face to flat.



Bolt patterns. As mentioned, the Corvair 6-bolt pattern is on a 2.75” circle. One of the main aftermarket bolt patterns is the Momo pattern. It is used on many different brands. The bolt circle for the Momo 6-bolt pattern is 70mm. 70mm is equal to 2.75591 inches. That is approximately .006” – Six thousandths of an inch difference. With that minor difference, the patterns are interchangeable – except that the Momo pattern is oriented differently. With the Momo pattern the six bolts are rotated 30 degrees from the GM pattern. There is one hole at the top, and the next holes are each 60 degrees to the left and right. If you just bolt on the Momo wheel, the wheel will be canted off to one side. If you then rotate the hub to straighten up the wheel, your turn signals will now cancel incorrectly left vs. right. Another common bolt pattern is the Nardi 6-bolt pattern. This pattern is oriented the same as the GM pattern, with the two upper holes spread 30 degrees either side of vertical. But the Nardi bolt circle is 72mm. One other note, the GM pattern includes several small scallops in the hole pattern, located between the GM 6-bolt holes. These scallops are clearance cuts to allow the mounting of the GM style horn button. If you want to use a Momo pattern wheel onto a GM hub – and use th GM horn switch and button,

you will have to open up slots in the wheel to allow the three bolts to reach the hub. When you are finished, the OEM-style horn button will cover over the slots, so they won't be visible.



MOMO Bolt Pattern

Aftermarket Hub Adapters

3-bolt flange adapters

Since the 1960-1963 wheel spline is the same as several other GM cars of that era, aftermarket hub adapters are available to install the old-style 3-bolt wheels. Grant sold P/N 4161.

At one time, Grant Racing sold an adapter for the 64-66 models for the three-bolt wheels. The only source for that adapter is now Clarks Corvair Parts. It is Clarks P/N C10641.

The 67-69 Corvair models use the same spline and signal canceling as the 67 Camaro, so hubs built for the 1967 Camaro will usually fit. The above data means you can easily install a 3-bolt Kustom wheel onto a Corvair. Grant still sells "Nostalgia" wheels with wood and rivets styles like the 1960s.

Most new custom wheels are now Leather wrapped or formed wood, though riveted wheels are available. Many of the new wheels resemble the factory "wood" wheels, but in real wood. (Note, there was a factory real "Rosewood" option offered for both the Corvette and the Camaro. Those wheels normally sell in four digit prices now.)

5 -bolt flange adapters

The most common 5-bolt pattern is the Grant "Signature Series" pattern. Many of their wheels use this pattern, though they don't always call it this. Some of them come with an adapter to mount the 5-bolt wheel onto a 3-bolt adapter. There are a few other 5-bolt wheels using the same bolt pattern. Grant and others sell adapters to mount a 5-bolt wheel onto a 3-bolt hub. These are available in various heights.

6 -bolt flange adapters

As noted, most of the aftermarket hubs support the 70mm Momo bolt pattern. You have some leeway in rotational adjustment until turn canceling gets weird. Sometimes the same 6-bolt adapter can be used to mount the GM pattern wheel, but since the 67-69 style column is a duplicate of the Camaro both GM-orientation and Momo Orientation specific 6-bolt adapters are easily available for them. The factory 6-bolt adapter for the 64 was a rare piece, used only with the "wood" wheel option. It fit only the 1964. It has now been reproduced.

5-bolt/6-bolt flange adapters

There are two adapters on the market that have both the 5-bolt and 6-bolt patterns. One bolt-hole is shared between the two patterns. The first adapter fits the 1960-63 Corvair models. The second adapter fits the 1965-66 models.

9-bolt flange Adapters

There are several custom wheels on the market which use a larger 9-bolt attachment. This was the Formuling France adapter pattern. Other brands have adapted it. There are several in-between adapters that mount onto the 6-bolt hubs and allow the 9-bolt wheel to mount. There may be adapters which will fit the 60-63 Corvair and the 67-69 Corvair. Nobody currently supplies a 9-bolt adapter for the 64-66 spline.

Horn Buttons

Each Year of the Sport Wheel option, 64, 65, 66 and 67, GM used a different horn button. They are interchangeable. All are being reproduced by Trim Parts. The horn-switches are similar but have a few differences. The switches can be modified to fit various years. A similar-year Corvette horn switch can be used with a few tweaks. These factory-style horn buttons can be used with many aftermarket 6-bolt wheels.



Aftermarket horn buttons

Most Grant horn buttons pop into the center of the wheel, leaving the bolt heads visible. Grant sells dozens of different snap-in Horn buttons, many with various Chevy logos. Many other aftermarket wheels also come with specific horn buttons. Sometimes these buttons fit the hub, sometimes they do not. Be prepared.