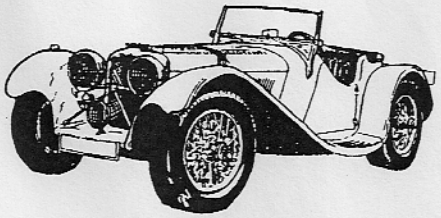


Squire SS-100 Registry

CLBCOM 128

SEPTEMBER - DECEMBER, 2004

THE SEPTEMBER MEETING
in Detroit was a lot of fun despite rain, wind and cold weather. Host Tim Wiegand cooked up a mess of seafood under tarps stretched to keep out most of the rain and with that and his heated shop we were all able to eat well and reasonably dry. With lots of volunteers helping, we were also able to replace his torsion bar bushings and check the spring tension on the bars which were OK.

A footnote or two to that is the fact we noticed that the spline drives were bone dry when we tried to remove the front wheels and had a hell of a time getting them off. So we greased them well with white lithium before reinstalling. Then we decided to check the rear wheels and found them to be even drier. This is a reminder that the splines are an important part of your maintenance program and your wheels should be removed once a year to be sure they are free and well lubricated.

The second foot note is that Tim took his Squire for a ride a few days after we all left and arrived home to realize he'd lost a rear wheel nut, (knock off) and that's really bad news since there are no replacements available. I advised him to carefully retrace his route and he was able to find it on the ground, a good news end to what could have been a bad news story. So, the lesson there is to be sure you hammer each wheel nut securely on after each removal.

MEET NEWEST OWNER
Brian O'Keefe of East Patchogue, Long Island, NY. Brian has restored a number of older vehicles and had spotted a Squire on Long Island a few years ago and thought he'd like to take a shot at restoring one. I gave him a list of the few Squires for sale and he bought Chassis # 29 out of Canton, Ohio, had it shipped to New York and is already well into restoration. Brian said he likes a challenge so he picked the right roadster, right guys?

REDUCTION IN BRAKE PEDAL EFFORT
is a very complete engineering report by Member Paul Dullaert on why the Squire SS-100 stops so hard and how to correct it, keeping in mind that you are still driving a car with manual hydraulic brakes that will not work like the power brakes on your new 2004 Belchfire. The report is attached and also enclosed is a new insert for your Parts & Repair Index. There have been some changes so discarding the original sheets is advised. Our collective hats off to Paul for this excellent report and also the revised pages to the R & R Index which he had printed in Canada and shipped to Phoenix.

AND BY THE WAY
if you discover some fault or repair that the other owners need to know about don't hesitate to send it along to Phoenix and we'll print it in the next newsletter and then include that data in a later issue of the R & R Index.

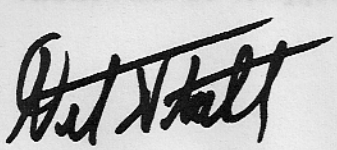
THE SQUIRE SS-100 NEWSLETTER COLLECTION
becomes more important to the ownership of the Squire each year, so much so that I am now advising potential owners to deduct $150 or more from the purchase price if they do not get a complete set with the car when they buy it. Why, because we know from fifteen years of experience that a new owner absolutely flounders from lack of information without them. Reproducing the entire collection and shipping them in three fifty letter binders has become a massive, time consuming job that I hate and I'm only charging for the printing, not my labor.

The newsletter collection starts with # 1 then up to this issue, # 128. If you are missing various copies and want them replaced let me know and I'll have them reproduced and shipped at whatever the cost. I've just made a complete issue copy for Brian O'Keefe and while at it, had three more complete sets made. So, if you need a complete set in binders and with the revised R & R Index, send me $100 and that'll put them in your mailbox.

THE 2005 SPRING THING
will be held next year at Chuck & JD Blethen's house in Scottsdale, AZ over the weekend of March 18,19 & 20 with most of Saturday spent at the Blethen's. So, if you're inclined to fly out and warm up, set that weekend aside to join us and start looking at cheap airfares to Phoenix, Southwest Airline being your best bet. I'll publish a list of motels and a map in the next newsletter and Chuck is planning a nifty vino surprise for those attending. We should have six or seven restored Squires there for your viewing pleasure.

2005 SQUIRE SS-100 REGISTRY MEMBERSHIP DUES
come up next and many of you have paid up one or more years in advance. So, if there is a return addressed envelope with this letter your dues are not paid ahead and please return it with $10 payable to Arthur Stahl. Also feel free to add future years dues and I'll keep track of it. Finally, I run a little in the red every year, not to mention replacing office equipment so if you're gainfully employed and want to help out, send me what you used to spend on cigarettes and the Registry will be back in the black.

AND ALWAYS REMEMBER
Honk if you love peace and quiet.

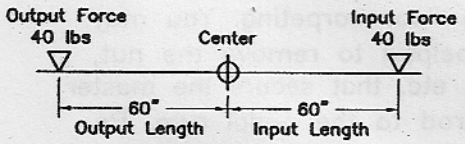


REDUCTION OF BRAKE PEDAL EFFORT

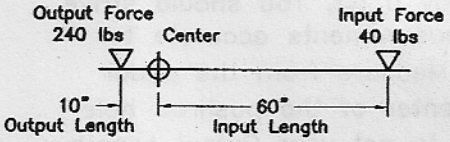
by Paul Dullaert – August, 2004

This applies to Squires with stock manual brakes. If all Squires were the same, and if all Squire owner's were mechanical engineers, I could just say, "Move the point where the master cylinder pushrod connects to the brake pedal arm down half an inch." That would cover it. But Squires and their owners are different so what follows is a more complete discussion.

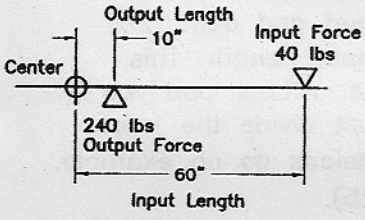
The brake pedal arm is a lever and leverage ratios can be changed to do more work with less effort. I believe it was when I was studying the excellent website of Master Power Brakes (www.mpbrakes.com) that I learned that the lever ratio should be 6:1 (six to one) for manual brakes (4:1 for power brakes). I found that my stock ratio was only 4.6:1. I increased it to 6:1 and reduced the effort required. Let's review how levers work so the principle is understood:



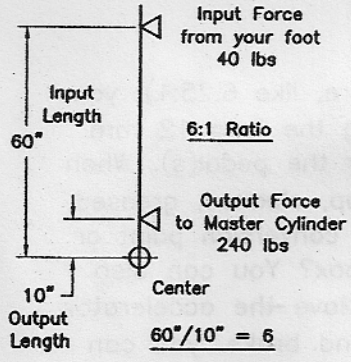
Here we have 2 children on a balanced teeter–totter. They each weigh 40 lbs and they are each 60" from the center (in the sense of a center of rotation, not necessarily the middle of anything). The rule is that the Input Force times the Input Length always equals the Output Force times the Output Length. The teeter–totter is balanced because 40 X 60 = 40 X 60 and the ratio is 1:1.



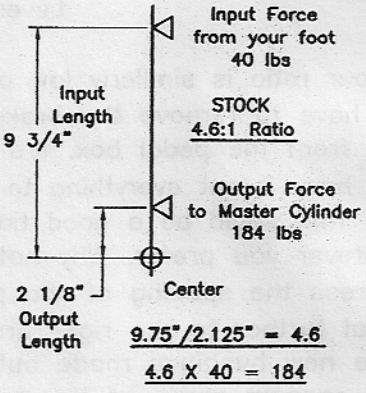
Now one child gets off and is replaced by his father who weighs 240 lbs. Dad has to be 10" from the Center because 60 X 40 = 10 X 240. Dad weighs six times what the remaining child weighs so he has to sit one sixth of the child's distance from the Center to balance. The lever ratio is now 6:1.

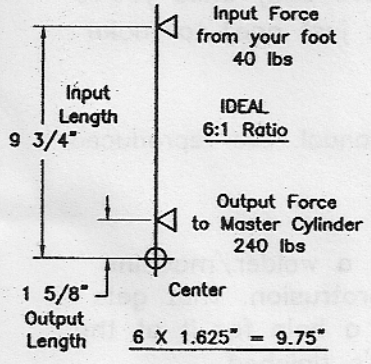


Suppose Dad moves over to the other side of Center? Now, to balance the teeter–totter he'll have to push up with 240 lbs force! But the Forces and Lengths haven't changed so the lever ratio is still 6:1. However, the diagram looks a lot like our brake pedal arm if we just rotate it 90 degrees counter–clockwise.



The diagram on the left shows how our brake pedal arm would work if it was a 6:1 ratio except that our arm isn't 60" long! The diagram on the right is the stock Squire geometry (as on #35) which yields a lever ratio of only 4.6:1. Our Input Force of 40 lbs only generates an Output Force of 184 lbs. To generate the same 240 lbs force on the master cylinder, we'd have to apply 52.2 lbs to the pedal (240/4.6 = 52.2). That's 30% more than the 40 lbs required with a 6:1 ratio. Since the Input Length is fixed we'll have to shorten the Output Length enough to raise the ratio to 6:1.

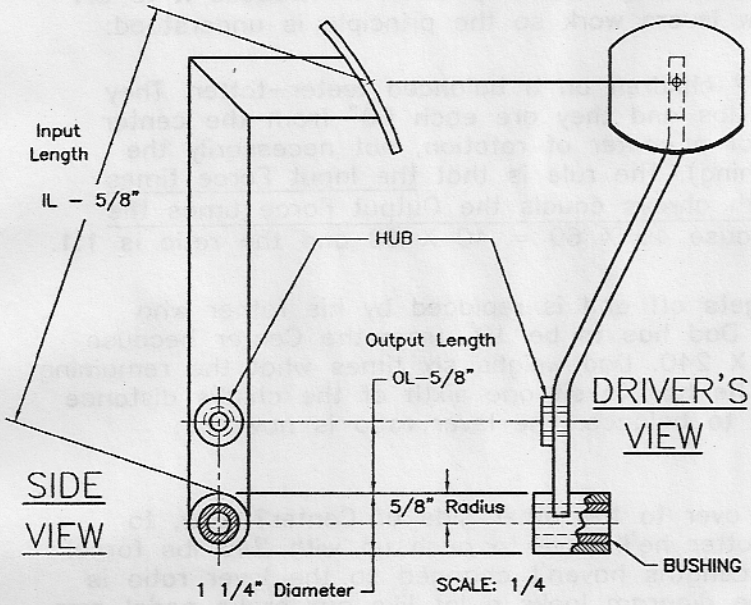




We don't know how hard we press on the pedal and we don't know how much force we need to generate on the master cylinder. But that doesn't matter; we know that if we change the lever ratio from the stock 4:6:1 to the ideal 6:1, we'll have to exert 30% less force on the pedal. Since we can't make the pedal arm longer, we'll have to change the Output Length. That is determined by the point at which the master cylinder pushrod is connected to the brake pedal. arm. Since not all Squires are the same, you'll have to make your own careful measurements to determine your Input Length and Output Length. Then you can find out what lever ratio your Squire has by this calculation: IL/OL = N. The ratio is N:1. If it's much lower than 6:1 you'll need to reduce the Output Length by moving the master cylinder pushrod connection point down the arm. To find out how much to move it you need to

calculate the new Output Length: OL=IL/6. The amount to move the pushrod connection point is the difference between the stock Output Length and the calculated new Output Length. You'll find it easier to work in decimals so, if you don't have a decimal equivalent chart, just divide the top number of each fraction by the bottom number. For example, a bit more than 3/4" is 25/32" and 25 divided by 32 is .78125" so 9 25/32" would be 9.78125".

It would be convenient if you could determine your present brake lever ratio without having to remove the pedal arm from your car to measure it. If we make just one assumption that all Squires have the same outside diameter steel tubing at the bottom end of the pedal arm, and if you're a bit of a contortionist, we should be able to do that. Here's a 1/4 scale drawing:



You will want to remove the driver's seat and the floor carpeting. You may also find it helpful to remove the nut, bolt, washers, etc. that secure the master cylinder pushrod to the pedal arm. Be careful not to drop parts into the pedal box. Then you can swing the pushrod out of your way a bit. You should strive to get the measurements accurate to within 1/16". Measure from the pedal tube to the center of the pushrod hole and add 5/8" to get your Output Length. Measure from the pedal tube to the center of the foot pad and add 5/8" to determine your Input Length. This must include whatever rubber pad you have, if any. Now just divide the larger number by the smaller one to find your ratio. If we use #35's original dimensions as an example, they would be like this: Ouput Length (OL) = 1 1/2 + 5/8 = 2 1/8" (2.125).

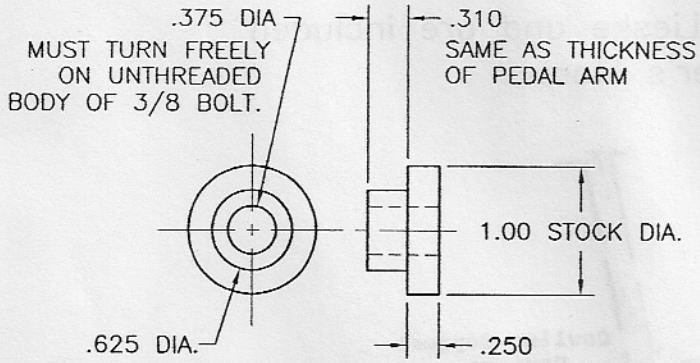
Input Length (IL) = 9 1/8 + 5/8 = 9 3/4" (9.75).

Lever Ratio = 9.75/2.125 = 4.6:1

If your ratio is similarly low and you want to make it 6:1 (or even a little more, like 6.25:1), you will have to remove the brake pedal arm from the car. This means extracting the long 12 mm bolt from the pedal box. It's the bolt that provides our center of rotation for the pedal(s). When you have it out everything to do with the pedals can be disassembled, freed up, cleaned, greased, etc. This would be a good time to clean out the box and paint it with a rust conversion paint or whatever you prefer. Why not drill a drain hole in each rear corner of the box? You can also address the spacing of the pedals if you find they are too close together. Move the accelerator pedal further to the right first, then see what you can do with the clutch and brake. you can have new bushings made out of nylon or acetal (Delrin) for the pedal arm tubes. You can have new spacers made of the same plastic, aluminum or brass (won't rust) to get the spacing the way you want it. Have a look at your brake light microswitch (if you still have one) while you're in there. It needs 2 pop rivets or screws through it's mounting bracket (not just one) to make sure it stays in position relative to the brake lever arm.

Bill Lieske provided a good drawing of all these parts in your Squire Owner's Manual. I've reproduced 2 of its 3 figures for you and included them on page 4 of this article.

To relocate the pushrod hub in the pedal arm you have to take the arm to a welder/machine shop and have them plug the stock hole and cut/grind off the stock hub protrusion. That gets you back to a plain solid arm. You get them to make you a new hub, drill a hole for it at the new location in the arm and press or weld it in place. Paint it black and it's finished.

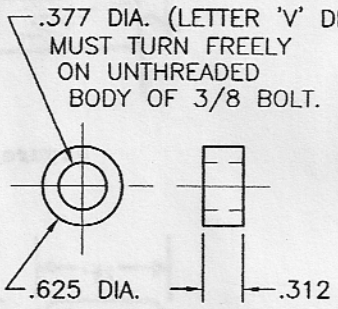


HUB

MAT'L: ROUND STEEL BAR
SCALE: 2/3

Here's a drawing of the new hub which you can take to the machinist. Normally you'd drill a clearance hole for a 3/8 (.375") bolt but we need a very nice fit and the maximum diameter of a .375" bolt is usually a little under .375" and it will fit nicely in a .375" dia. hole. You need a 5/8 (.625") dia. hole drilled at the new location in the lever arm. The .250" (1/4) dimension will duplicate the stock hub but that may not be what you need if you have changed the spacing of your pedals. You want the pushrod to line up with the axis of the master cylinder so you may have to change the .250" dimension either to improve on the stock alignment or to accommodate your new pedal position. You can always add flat washers as required but that's not very good practice; a hub of the correct length is better. This will become clearer below.

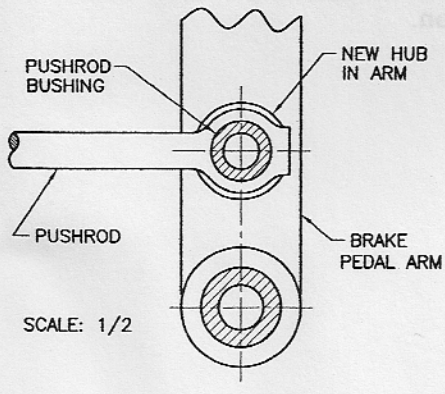
I don't know how your master cylinder pushrod is connected to your brake pedal arm. I don't think #35's was stock; it was something pretty sloppy so I redesigned the connection. It's by no means the only way to do it but at least it's simple. I had this bushing you see to the right made. It slips into the big hole in the end of the pushrod. You'll see that it has a .377" dia. hole in it whereas the hub above has a .375" dia. hole. That's because the hub is steel and the bushing is plastic. Plastic tends to relax after you've drilled the hole so a .375" hole may fit over the bolt at the shop but the next morning it may be too tight.

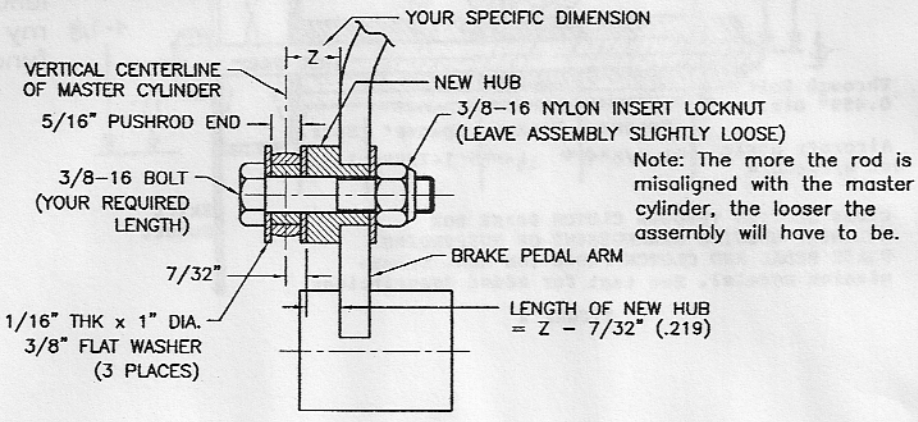


BUSHING

MAT'L: NYLON OR DELRIN
SCALE: 2/3

You'll see in the assembly drawing below why it's important to get the pushrod lined up with the master cylinder in the side to side direction but you may be wondering how we get away with moving the attachment point something like half an inch in the up and down direction. Do you have to move the master cylinder down by the same amount? No, apparently not. The pushrod is made so that it can swivel quite a few degrees in any direction away from the centerline of the master cylinder. It can't be rigid because the pedal arm swings in an arc, not straight in and out. If I remember correctly, the forward end of the rod is a ball shape. On my master cylinder I can give the rod a tug and it comes right out of the master cylinder. When I push it back in it snaps into place. Yours may be different so don't destroy it trying to pull it out. It can stay where it is. I had my master cylinder out when I did all this so I was able to check very carefully what was the effect of moving the connection down the arm. I made a hardwood block the shape of the master cylinder mounting flange, The block had the same mounting bolt holes and a small hole right in the center through which a nice straight hardwood dowel would fit. I bolted the wooden block to the firewall and slid the dowel through it to see where it landed on the pedal arm. I discovered that the stock connection point was well above the dowel (and it worked fine) and my new connection point was only slightly below the dowel (so it was actually an improvement). Yours may not be exactly the same as mine; it's a hand-made car.





Figures 1 and 2 are by Bill Lieske and are included in the Squire Owner's Manual

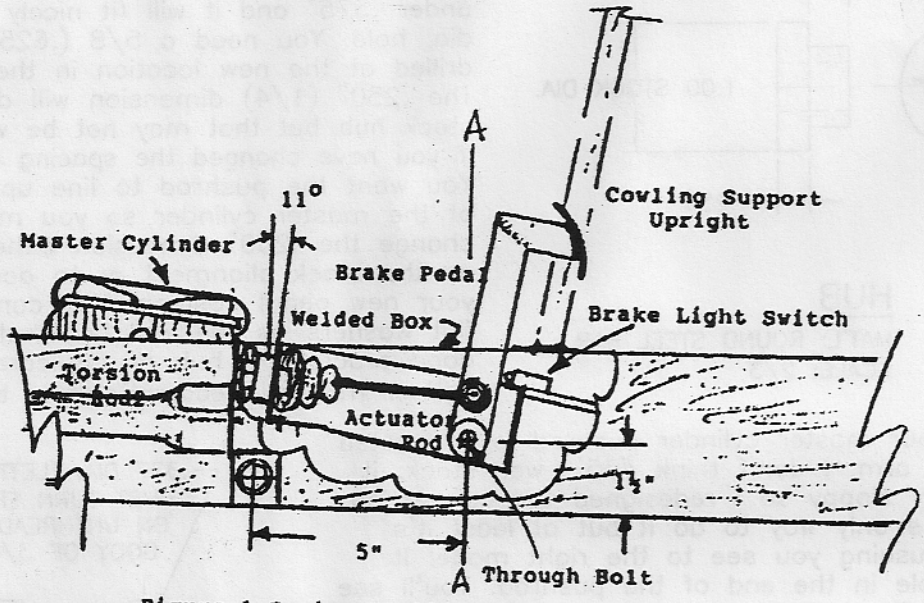
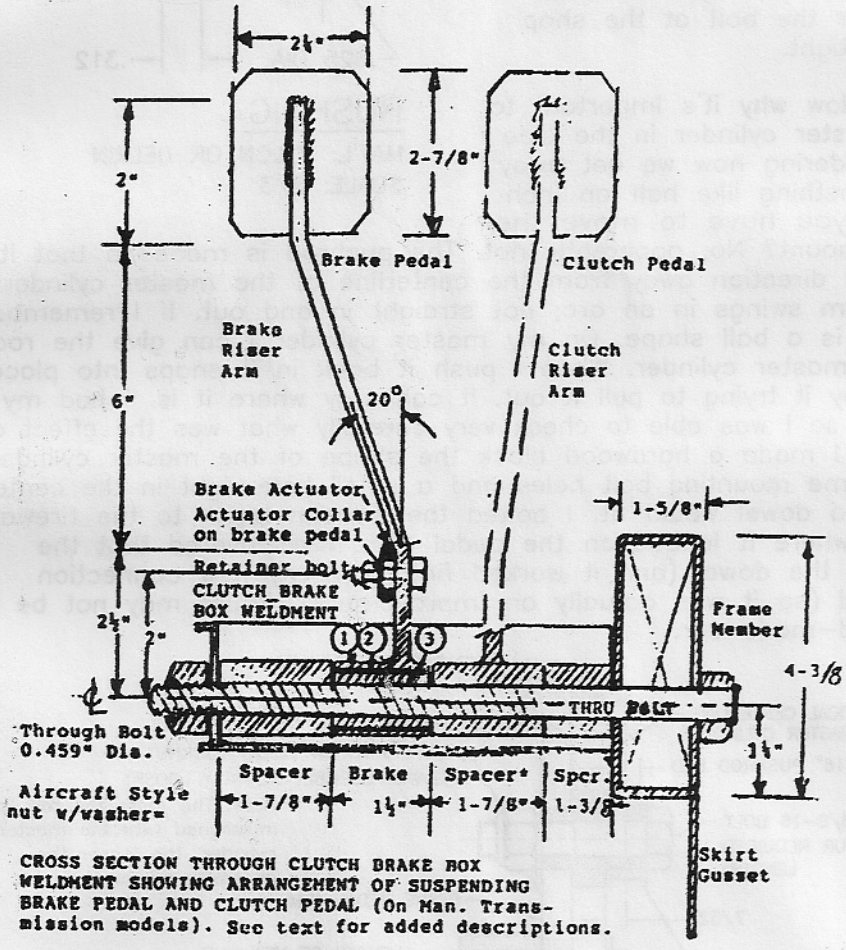


Figure 1 Squire SS-100 Brake Pedal Mounting



CROSS SECTION THROUGH CLUTCH BRAKE BOX WELDMENT SHOWING ARRANGEMENT OF SUSPENDING BRAKE PEDAL AND CLUTCH PEDAL (On Man. Transmission models). See text for added descriptions.

FIGURE 2

Now I hope you understand how to find out what your brake pedal lever ratio is, how to calculate what your Output Length should be to obtain a 6:1 ratio, and what is involved in changing your brake pedal mechanism. As far as my observed improvement is concerned, I can report that my wife, who is not a strong woman, is able to lock up the wheels when an urgent stop is required (this happens from time to time when I'm driving too). Having said that, there is still no doubt that the brakes are not power assisted. I tell myself that this is as it should be in a car that is intended to duplicate a 1937 driving experience. I am quite content with my drum brakes as they now function.