

## *Manual Brake Conversion Kit (MMBAK-10)*



**DISCLAIMER:** The Maximum Motorsports Manual Brake Pedal is NOT intended for use with a stock, unmodified braking system. Stopping distances will dramatically INCREASE if the Manual Brake Pedal is used with the OEM small front disc/rear drum braking system.

*Read all instructions before beginning work. Following instructions in the proper sequence will ensure the best and easiest installation.*

Thank you for purchasing the Maximum Motorsports' Manual Brake Conversion Kit. The MM kit will help eliminate the problems associated with power-assisted brakes. You will find many features that set our Manual Brake Conversion Kit apart from the rest.

- We include a new brake pedal arm. The MM kit only moderately increases the brake pedal effort because we changed the pedal arm geometry from that of power-assisted brakes to the proper mechanical leverage ratio for non-assisted brakes.
- MM's engineers designed our pedal to be stronger than the stock pedal arm. We even built a fixture to conduct destructive comparison testing of a stock pedal arm and our new arm. The tests confirmed that our new pedal arm not only has more ultimate strength before permanently deforming, but also is more rigid in normal use. This increased rigidity contributes greatly to better brake pedal feel, as well as to improved control when modulating the brakes.
- The MM kit has a unique pedal pad assembly. The pedal pad bolts to the pedal arm in any one of six possible positions. This allows you to customize the brake pedal's position to suit your needs. The pedal pad has two possible fore and aft positions, and three

possible vertical positions. This lets you fine-tune the mechanical leverage ratio to suit your preferences. Also, the position of the pedal pad, relative to the throttle pedal, can be changed to aid in heel-and-toeing.

- The MM kit includes a new, and stronger, adjustable length pushrod that attaches to the pedal arm with a spherical rod end. This attachment method eliminates the sloppy fit of the stock pushrod, further improving the pedal feel.
- The MM kit includes a new brake light switch and pedal stop.
- The MM kit allows the use of the factory cruise control.
- The MM kit has a CNC machined aluminum adapter block that bolts to the firewall in place of the vacuum booster. This adapter is designed to mount a stock Ford master cylinder. By using readily available Ford master cylinders, you are assured of always being able to find one easily, whether at home or at the track. For most applications we recommend the 1993 Cobra master cylinder, with its 1" bore. Other Ford master cylinders (from 1986-1995) can be used if a different bore size is desired.

### NOTES:

The brake hard lines under the hood will need to be rerouted, as the brake master cylinder will be positioned about 6.5" closer to the firewall after installing this kit. MM offers several adapter kits to help complete the installation.

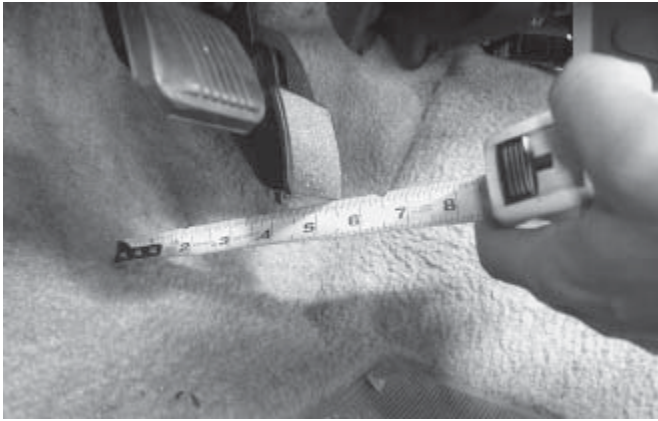
A cap must be sourced to properly seal the intake manifold after the vacuum booster is removed.

### Preparation

1. Disconnect the negative terminal of the car's battery.
2. Disconnect the positive terminal of the car's battery.

NOTE: Both battery terminals must be disconnected for at least 2 minutes prior to disassembly of the dash. Failure to do so can increase the risk of an accidental discharge of the vehicle's airbag.

3. Measure the stock pedal pad position and record for future reference.



4. Remove any paneling and/or components covering the steering column and its mounting bolts under the dash. For ease of product installation, we recommend removing the driver seat.
5. Remove the 4 nuts holding the steering column assembly to the pedal box, and swing the column down away from the pedal box. Disconnect any wiring or other attachments to the steering column.
6. Remove the two retaining clips holding the steering column brace in position on the pedal box.

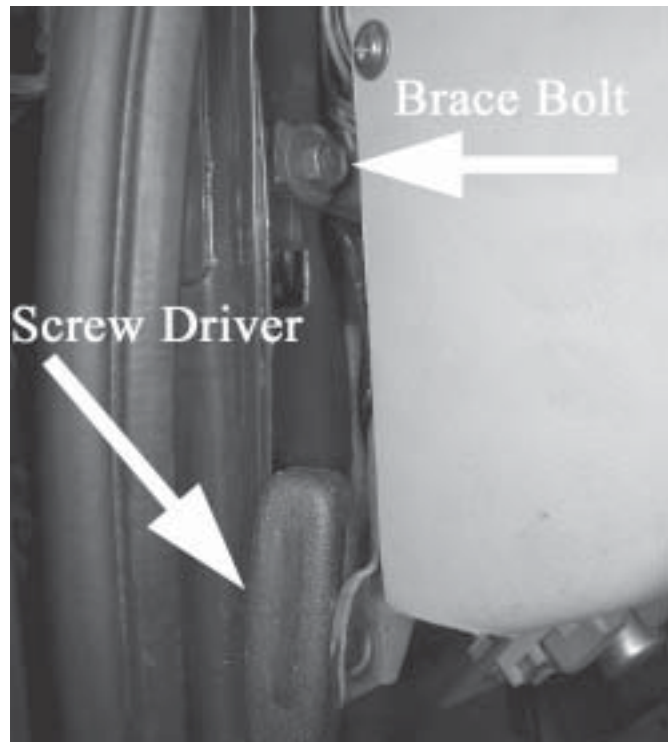


7. Disconnect the pushrod from the stock brake pedal. Save the OEM retaining clip for later use in Step 24.
8. Remove the nuts from the 4 brake booster studs protruding through the firewall, which secure the pedal box to the firewall. This will remove the primary support holding up the brake booster & master cylinder; be careful that they do not fall under their own weight and accidentally bend or kink any brake hard lines. (*Tech tip:* Due to limited access, it can be helpful to use a socket with a universal or long wobble extensions.)
9. Remove the master cylinder and brake booster from the car. It will be necessary to disconnect the master

cylinder hard lines and booster cylinder vacuum line at this time.

10. Cover any exposed brake lines or ports to avoid getting contaminants in the brake system.
11. Permanently seal any vacuum lines or ports that are exposed as a result of removing the brake booster. Most auto parts stores carry rubber caps for this purpose.
12. Remove the steering shaft to steering column connecting bolt in the engine compartment.
13. Remove the steering column from the vehicle.
14. Remove the driver side kick-panel from the vehicle.
15. Remove the lower dash retaining bolt on the driver side.
16. Pull away the rubber door seal that is adjacent to the dash.
17. Carefully pull the dash rearward enough to remove the outboard steering column brace bolt.

NOTE: Place the handle of a screwdriver between the dash and the doorjamb pinch weld to hold the dash away from the brace bolt.



18. Remove the steering column support brace.

19. Disconnect any remaining items preventing removal of the pedal box, such as the clutch cable, wiring harnesses, etc.
20. Remove the remaining upper bolt and nut holding the pedal box under the dash and remove the pedal box from the vehicle.
21. Remove the OEM brake pedal from the pedal box. Do not discard the pivot bolt, crush sleeve, pivot bushings, or pushrod retaining pin; you will need to re-use these items.



**SAVE THESE ITEMS**

22. The wiring connector that was connected to the OEM brake light switch will be modified in Step 49.

### Brake Pedal Arm Installation

23. Slide the ½" rod end over the mounting stud on the MM Pedal Arm.
24. Push the OEM retaining pin into the hole exposed on the end of the mounting stud. Make sure you push it on far enough that it snaps securely over the end of the mounting stud.

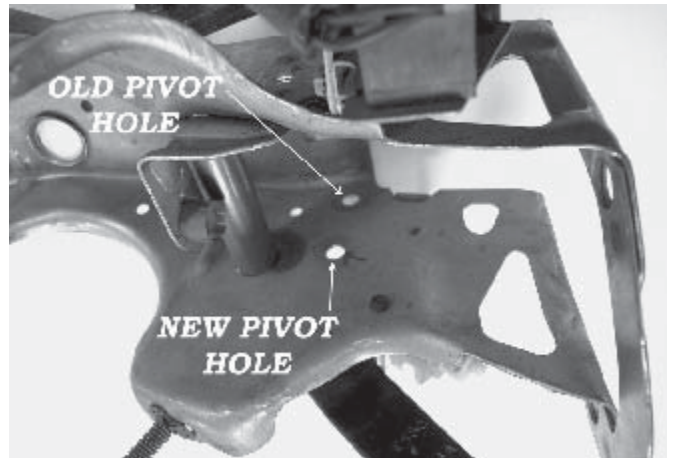


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25. Fully thread the pushrod onto the rod end as a preliminary starting point for final brake pedal positioning (Step 56).
26. Transfer the OEM crush sleeve and pivot bushings into the pivot tube of the MM Pedal Arm.



27. Locate the second, lower pair of mounting holes in the OEM pedal box. These holes are located about 1" below the original pivot holes.

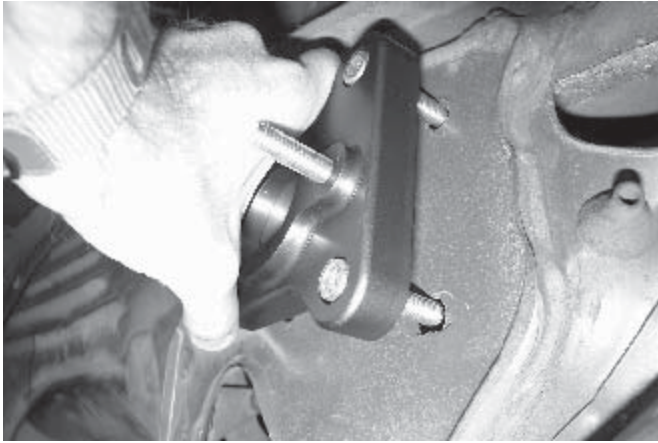


28. Mount the MM Pedal Arm in this lower pair of holes, re-using the OEM pivot bolt & nut.
29. Torque the pivot bolt to 19 ft-lbs.

### Firewall Adapter Block Mounting

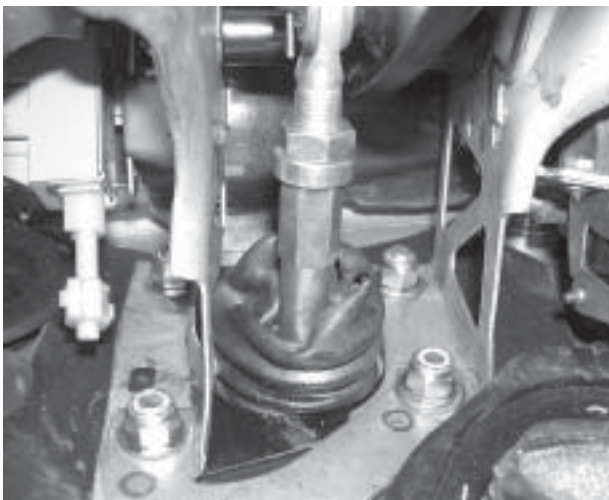
30. Re-install the OEM pedal box under the dash in its original position, using the upper mounting bolt and nut to hold the assembly in place. You will have to feed the pushrod through the hole in the firewall as you move the pedal box into position.
31. Snug the upper mounting bolt and nut, but do not fully torque them yet, in case the pedal box position needs to be adjusted to fit with the MM Adapter Block.
32. Mount the MM Adapter Block on the firewall, oriented so that the side with 4 studs is pointed towards the firewall. Insert the studs through the 4 holes originally

used by the brake booster. The studs should pass through the 4 mounting holes in the pedal box, on the interior side of the firewall. The pushrod must pass through the central hole of the MM Adapter Block.



NOTE: The adapter block studs will only fit when the adapter block is oriented properly. Rotate the block in 90° increments until the studs pass through the firewall.

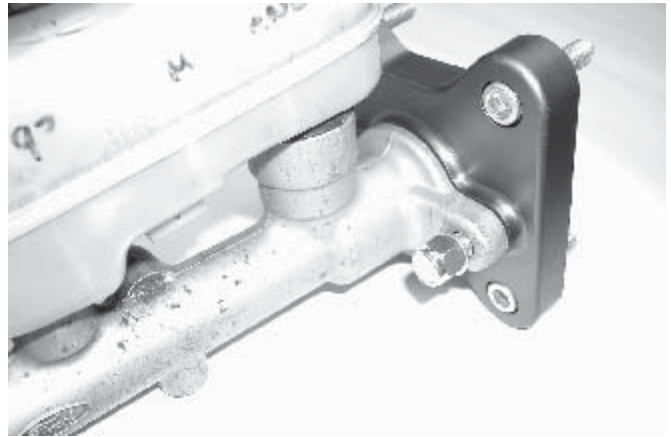
33. Place a 3/8" G8 washer over each stud, on the interior side of the firewall.
34. Place a 3/8" Nylock nut on each stud and torque to 19 ft-lbs.
35. Torque the upper factory bolt and nut to 15 ft-lbs.



#### Master Cylinder Re-Installation

36. Mount the master cylinder onto the Adapter Block. Guide the pushrod into the receiver cup of the master cylinder as you slide it into position.

37. Place a 3/8" AN washer over each of the remaining two studs on the engine side of the adapter block.
38. Place a 3/8" nylock nut on each stud, and torque to 19 ft-lbs.



39. Reconnect the brake hard lines to the master cylinder.

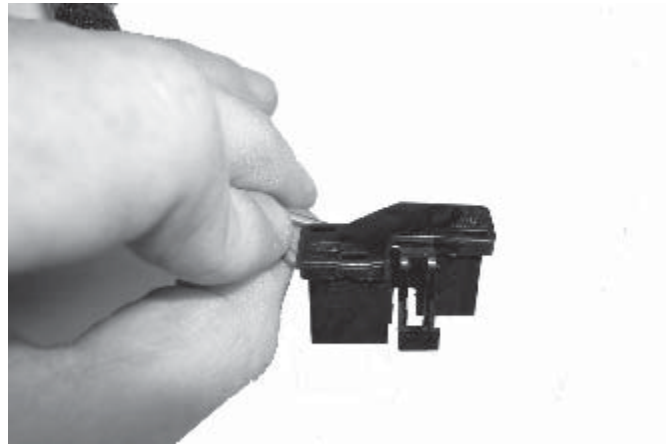
NOTE: It is possible to straighten out the stock hard lines and connect them to the master cylinder. However, if you do not feel comfortable doing so, MM offers several adapter kits to help complete the installation.

#### Brake Light switch Bracket Installation

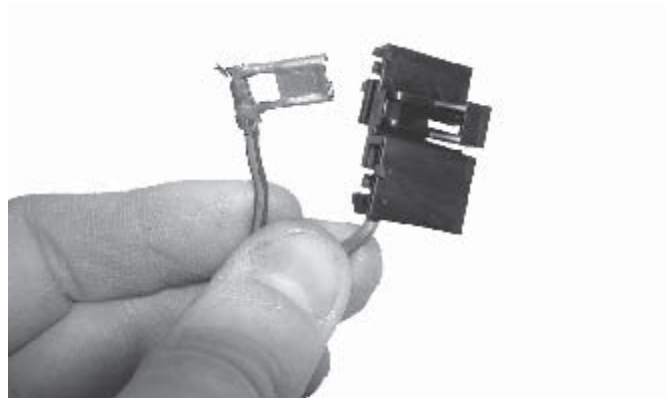
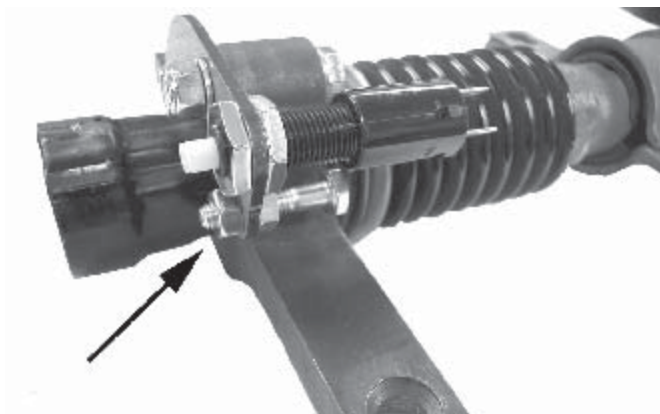
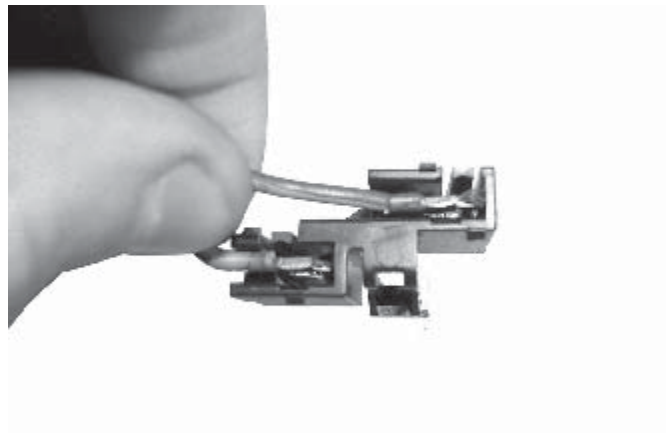
40. With the steering column out of the vehicle, place the brake light bracket on the forward (firewall) side of the steering column crossbar, and line up the two 5/16" bolt holes in the bracket with the two existing holes in the column crossbar.



41. Place a 5/16" AN washer over each 5/16" bolt.
42. Slide a 5/16" bolt through each of the two mounting holes.
43. Place another 5/16" AN washer on each 5/16" bolt on the rearward side of the column crossbar.
44. Place a 5/16" nylock nut on each bolt, and torque to 19ft-lbs.



45. Install the new brake light switch in the largest hole in the switch bracket. Use the supplied sheet metal nuts to secure the switch against the bracket. Position the switch fully rearward for now.
46. Thread a 1/4" nut on the 1/4" bolt.
47. Slide the 1/4" bolt into the smallest hole in the switch bracket, with the bolt head facing rearward.
48. Thread the other 1/4" nut on the 1/4" bolt, on the forward side of the switch bracket, and snug it down. Position the tip of the bolt fully rearward for now.



### Brake Light Switch Modification

49. Remove the top from the OEM brake light switch plastic connector.
50. Remove the wires; there is a small tab that holds each wire inside the connector. Leave the wires loose for now.

### Remaining OEM Components

51. Re-install the remaining components under the dash that were taken loose during the pedal box removal, such as clutch cable, wiring connectors, steering column assembly, and dash paneling. Torque the steering shaft to steering column connecting bolt to 54 ft-lbs.

## Brake Pedal Pad Mounting

Note: The MM Pedal Pad's vertical height on the Pedal Arm can be adjusted, which in turn changes the pedal ratio. We recommend starting with the MM Pedal Pad mounted in the middle pair of holes on the Pedal Arm, since this approximates the original Ford manual brake pedal ratio. If, after road testing the car, you find the pedal effort and pedal travel not to your liking, the pedal ratio can be adjusted by mounting the Pedal Pad in one of the other sets of holes on the Pedal Arm. Mounting the Pedal Pad in the upper-most pair of holes results in a Pedal Arm length that is  $\frac{3}{4}$ " shorter; this means you will have less pedal travel and a higher pedal effort. Using the lowest pair of holes results in a Pedal Arm length that is  $\frac{3}{4}$ " longer; this means you will have more pedal travel and a lower pedal effort.

52. Place a 3/8" AN washer over each 3/8" bolt.
53. Position the MM Pedal Pad at the desired location on the Pedal Arm, and slide the two 3/8" bolts through your two selected mounting holes.
54. Place a 3/8" AN washer over the tip of each bolt.
55. Thread a 3/8" nylock nut onto each bolt, and snug down.

## Driver Adjustments

Note: The OEM brake pedal placement is considered by many drivers to be too "high", relative to the gas pedal. This makes heel/toe downshifting difficult. The adjustability of the MM Brake Pedal Pad allows it to be moved closer to the elevation of the gas pedal. The brake Pedal Pad "height" can be adjusted by two different methods. Switching between the two sets of mounting holes on the Pedal Pad is a coarse adjustment. Adjusting the pushrod length, and then adjusting the Pedal Arm Stop Bolt to match, is a fine adjustment. First, adjust the Pedal Pad height through the mounting bolts. Then fine-tune the height by adjusting the pushrod.

56. Have the driver sit in the driver's seat, and determine if the Pedal Pad position is suitable. Adjust the Pedal Pad height first, and then fine-tune the adjustment with the pushrod length.

NOTE: It may be helpful to use the measurement made in Step 3 to set the initial position of the pedal before placing the driver in the vehicle.

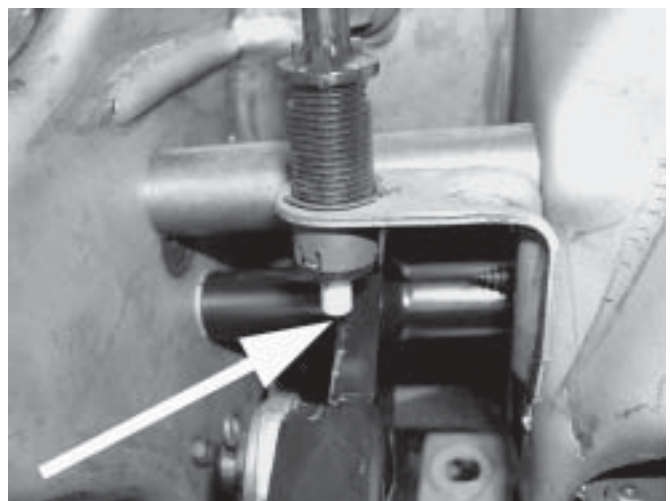
57. Torque the 3/8" bolts fastening the Pedal Pad to the Pedal Arm to 33ft-lbs.

58. Snug the  $\frac{1}{2}$ " jam nut of the rod end against the pushrod to prevent the pushrod length from changing.

Note: Once the final Pedal Pad position has been determined, the brake light switch and Pedal Arm Stop Bolt must be adjusted to contact the Pedal Arm. The brake light switch is a normally-closed switch; it must be positioned close enough to the Pedal Arm that the plunger is depressed when the pedal is at rest (foot off the brake pedal), opening the circuit.

59. Adjust the Pedal Arm Stop Bolt so that the bolt tip barely contacts the Pedal Arm when the pedal is at rest, then firmly tighten.
60. Connect the brake light switch wires to the contacts on the back of the brake switch.
61. Reconnect the positive battery terminal.
62. Reconnect the negative battery terminal.
63. Adjust the switch position very close to the open/closed breakpoint, so that a very small amount of pedal movement closes the circuit and activates the brake lights. Tighten the sheet metal nuts on the switch housing so the switch will not move.
64. If the vehicle is equipped with cruise control, readjust the cutoff switch so that the tip is fully depressed when the pedal arm is resting against the pedal stop.

NOTE: If the cutoff switch does not contact the pedal arm, it will be necessary to slightly bend the switch mounting bracket (use a pair of pliers) until contact is made. The cruise control module will not activate unless the cutoff switch is fully depressed.



## Finishing the installation

65. Bleed the brake system as per the factory shop manual.

66. Carefully test-drive the car. The pedal effort of non-assisted brakes may seem quite high at first, when compared to power-assisted brakes. After driving the car it will become apparent that while the pedal effort is higher than with power-assisted brakes, the effort is not unduly high. If after test-driving you wish to change the pedal effort and pedal travel, go to the Brake Pedal Pad mounting section.

Changing the size of the master cylinder will also alter the amount of pedal effort and travel. Switching to a master cylinder with a smaller bore will decrease pedal effort, while increasing pedal travel. Switching to a larger master cylinder will increase pedal effort, while decreasing pedal travel.

This kit includes:

- 1 Master Cylinder Adapter Block
- 1 Brake Pedal Arm
- 1 Brake Pedal Pad
- 1 Brake Pushrod Assembly
- 1 Brake light Switch Mounting Bracket
- 1 Brake light Switch
- 1 Rod End, 1/2", Male
- 1 1/2-20 Jam Nut
- 2 5/16-18 x 1-1/2" Hex Bolt
- 4 5/16 AN Washer
- 2 5/16-18 Nylock Nut
- 2 3/8-16 x 1-1/4" Hexbolt
- 6 3/8 AN Washer
- 4 3/8 SAE Washer, G8
- 8 3/8-16 Nylock Nut
- 1 1/4-20 x 2" Hexbolt
- 2 1/4-20 Nut