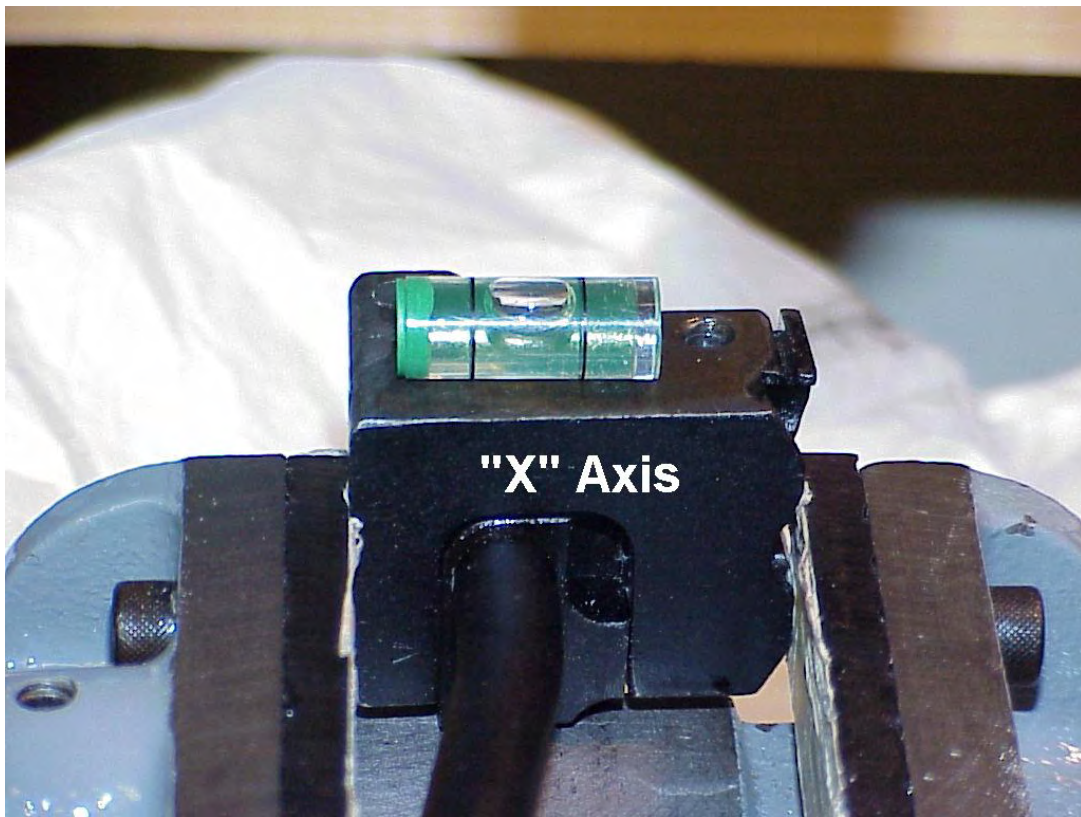
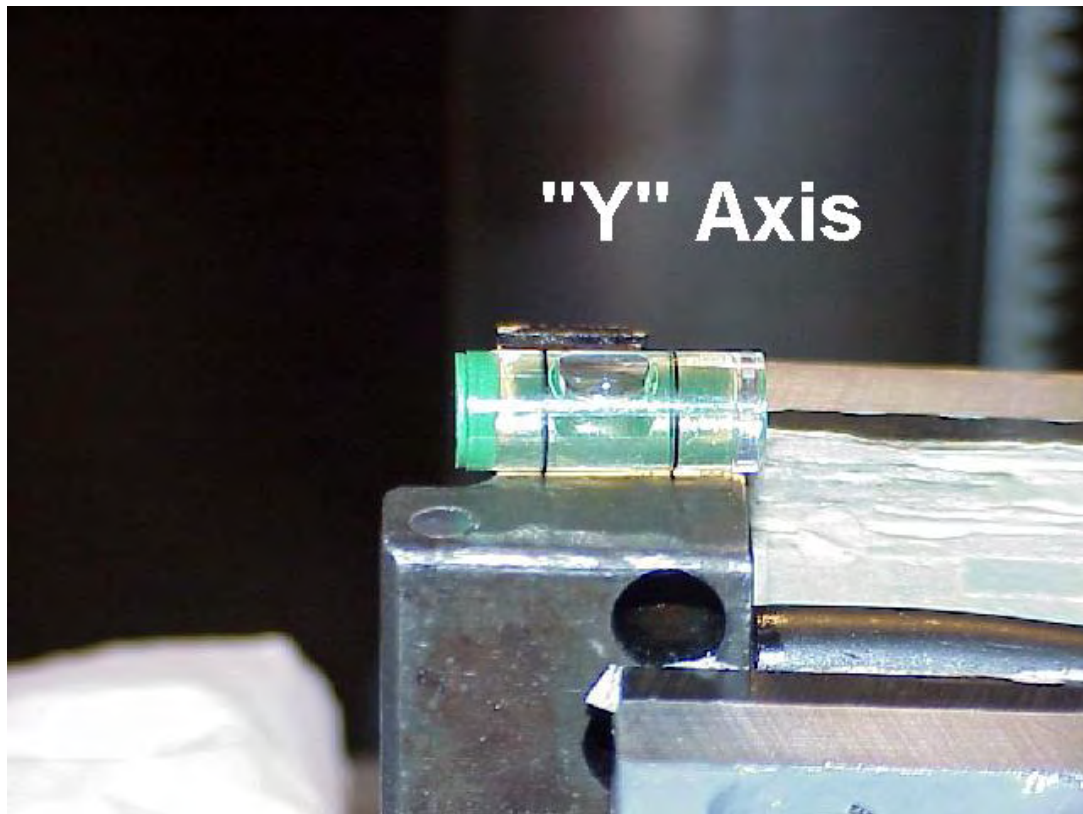


Removal Of Rear Trunnion Rivets On AK-47/74 Type Rifles

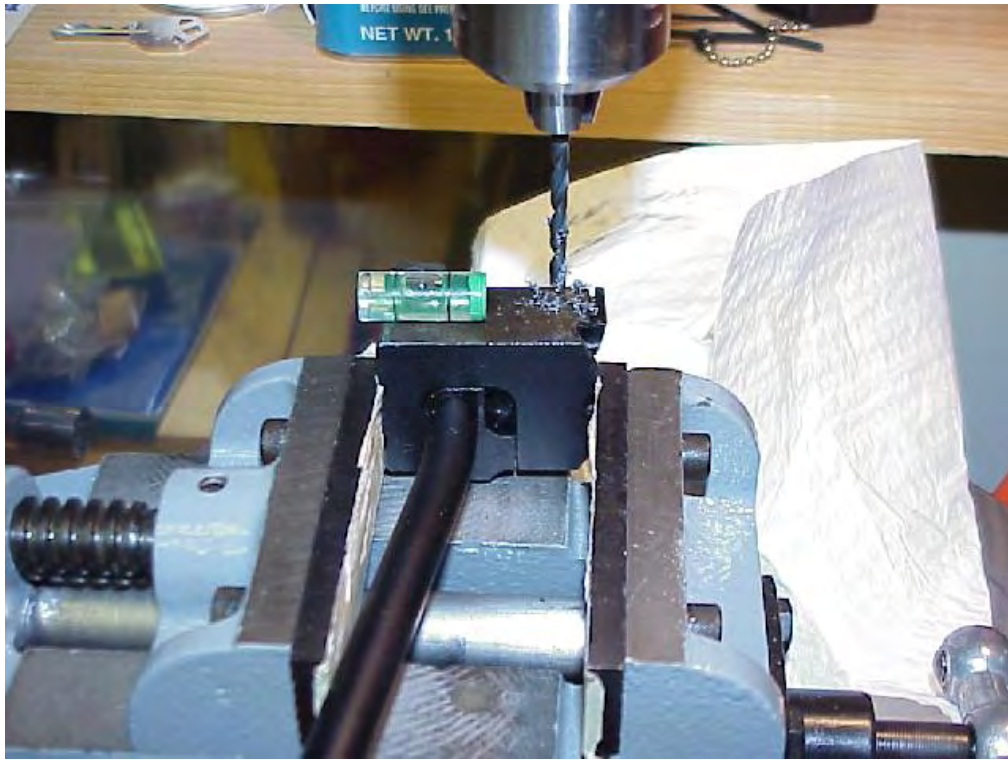
Following the below information will allow you to drill out the rear trunnion rivets without braking the drill bit. While cobalt or other exotic drills are nice to have, this entire operation was accomplished with standard high speed steel drills. The important thing to remember is to have "SHARP" drill bits (Drill Doctor will provide you with sharp drills). **WEAR EYE PROTECTION DURING DRILLING**

1. Using a file, remove any excess rivet that protrudes above the rear trunnion surface.
2. Chuck the rear trunnion in the drill press vise and make level on both "X" and "Y" axis. Failure to accomplish this leveling may cause the drill bit to hit the side of the trunnion and snap.





3. Using a #3 center drill, locate center of rivet and drill a small pilot recess. Remove the center drill and insert a #31 drill. This will be the first drill you will use to drill completely through the rivet.
4. Put some lubricant on the drill and also in the pilot recess.
5. This type of drilling is considered “Deep Drilling” and extra care is required to prevent the drill from locking up and braking. Drill RPM should be around 425 – 500, feed rate into the rivet should be very slow (were not in a race).
6. Begin drilling. Every time you drill deeper than 2 -3 times the diameter of the drill bit, clean all metal chips from the drill and the hole. After cleaning the chips away from the work, re-lubricate the drill and hole. Continue drilling and cleaning and lubricating until you have drilled through the entire rivet. **Again, feed rate into the metal rivet needs to be slow.**



7. Once through the rivet, change drills and continue with the same practice as outlined in item # 6.
8. Drills used to accomplish this operation were:
 - a. # 3 Center Drill
 - b. # 31 through # 19 drills
 - c. # 18 and # 17 drills were needed on removing one of the rivets but might not be necessary in all applications.



9. When you have completed drilling using the # 21 drill, each succeeding drill should be used with more care as at one point the rivet will start to come out as the drill cuts into it.



10. As a final note, listen to what sounds the drilling operation is making. As you proceed with larger drills if you start to hit the hard steel of the trunnion the sound of the drill hitting that material will sound different (kind of like a chirping sound) than when drilling into the rivet. If this occurs slowly withdraw the drill, clean the drill and hole, re-lubricate the drill and hole and try again (**feed into the hole must be slow**). If the noise continues stop drilling and use an “Easy Out” to remove the rivet.

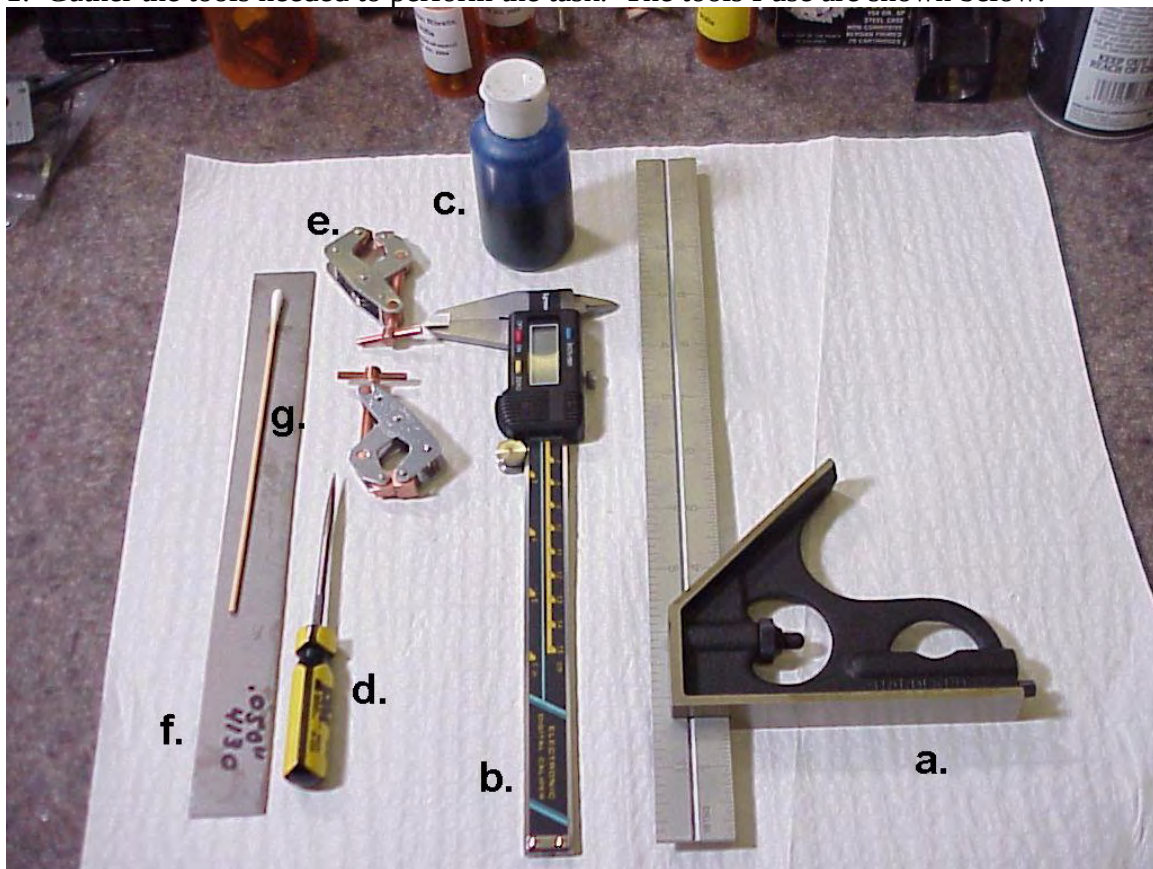
I have been using this technique for all my rear trunnions and never had any problems. The most important item is not to rush, take your time.

Layout of Receiver For Front and Rear Trunnions

(This is for layout only, does not include the installation of the trunnions)

In order to set the front and rear trunnions into the receiver we usually need to remove some material from the upper rails. For the novice this can be a troublesome task. You want to remove equal material from each rail to have a close fit of the trunnion. The information provided will instruct you how to accomplish this. As always, there are other ways to accomplish this and this is just one of them.

1. Gather the tools needed to perform the task. The tools I use are shown below.



a. Square

b. Dial Caliper

c. Layout Blue

d. Scribe

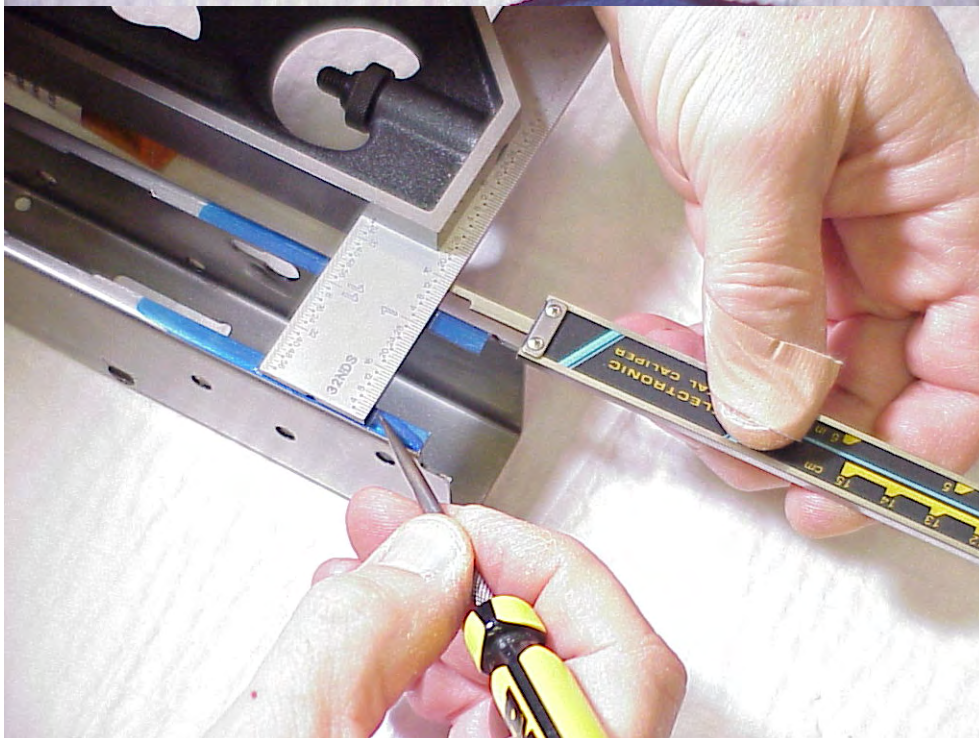
e. Small Clamps

f. Sheet Stock .050" x 6"

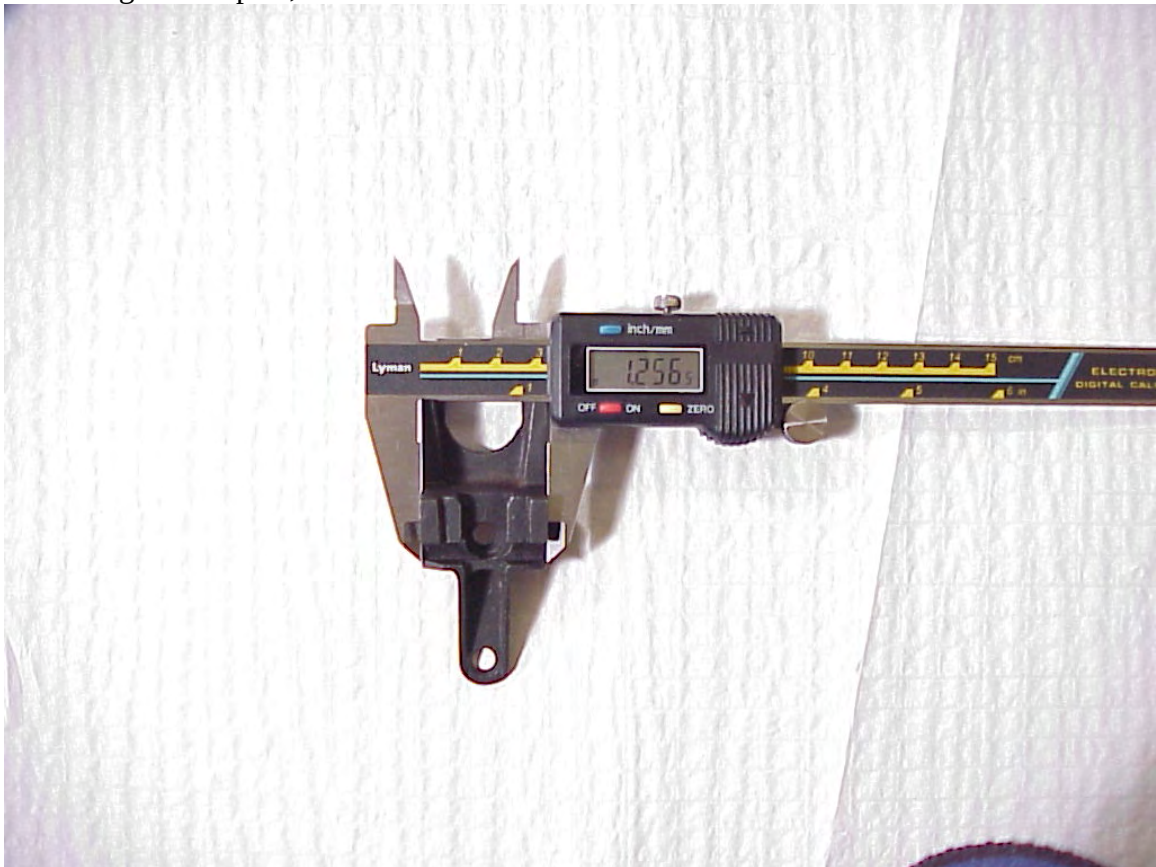
g. Q-Tip to apply the layout blue

2. Using the Q-Tip, apply the layout blue to the upper rails, doing this now, will allow the blue to dry.

Since I was working on a bent flat, the amount of material that needed to be removed for overall length was very small and also the trunnion rivet holes were pre-drilled. That allowed me to mark the length of the front and rear trunnions (+ some) by measuring the length of each and marking that dimension on the upper rails. The rear trunnion is shown as an example. **If you are not working from a flat with the rivet holes pre-drilled, you will need to take the measurements after the front trunnion is located and then the receiver top cover will determine this distance.**



3. Taking the calipers, measure the outside dimension of the rear trunnion.



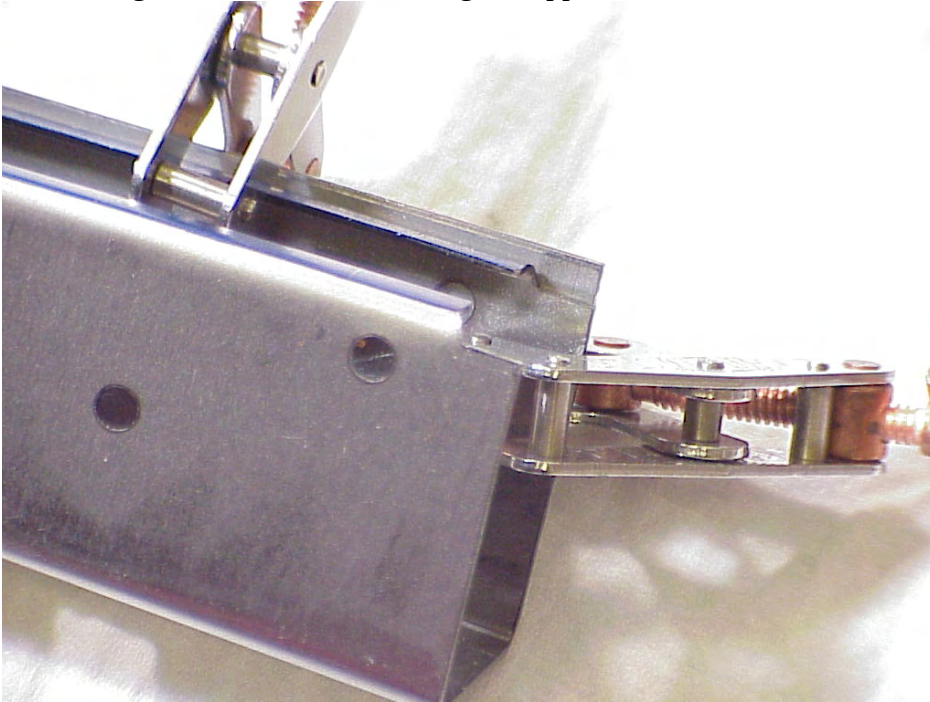
4. Measure the inside slots (this is where the upper rails will go into).



5. Subtract the second measurement (1.052") from the first (1.256"). I ended up with .204". Divide this number by 2 and you end up with .102". Add the thickness of the receiver material, which in my case was .040" and my final figure is .142".

6. Set your caliper to read .142"

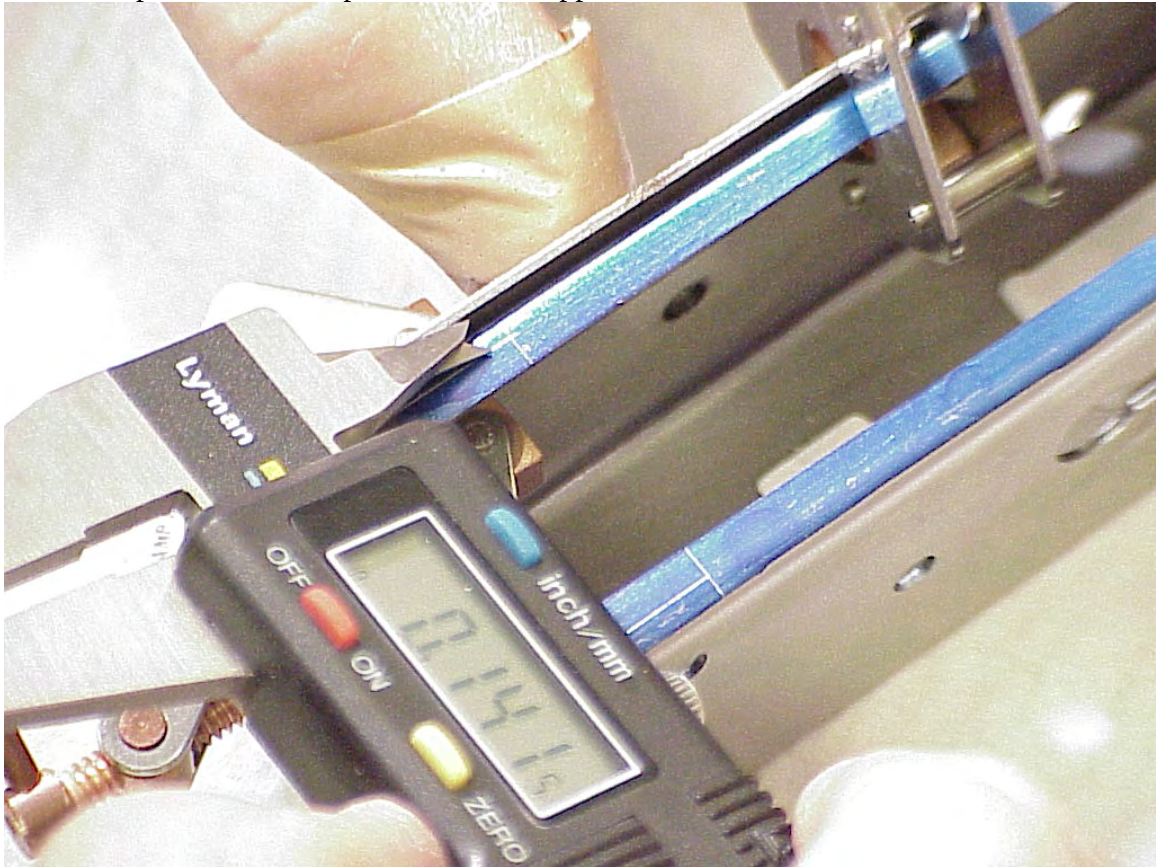
7. Using the .050" flat stock, clamp the stock to the side of the receiver. This will become a guide or fence for marking the upper rails.



8. Take the calipers, set at .142" and scribe a line on the upper rail using one side of the caliper against the guide/fence. In the picture the calipers are showing .141" which is close enough.



9. Accomplish the same operation on the opposite rail.

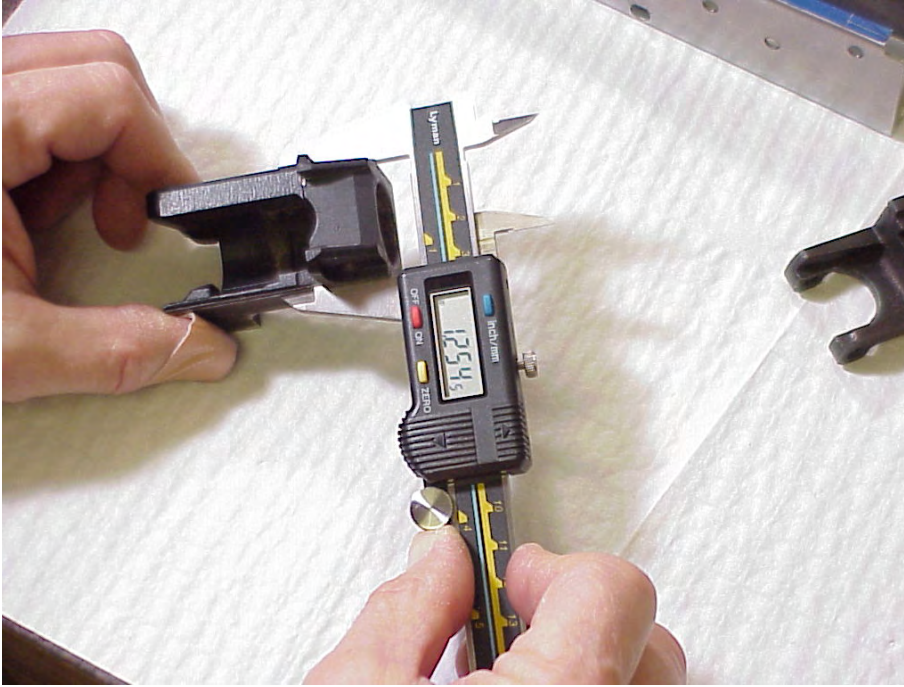


10. The completed job should look like this.



For the front trunnion the operation is the same.

10. Measure the front trunnion outside dimension.



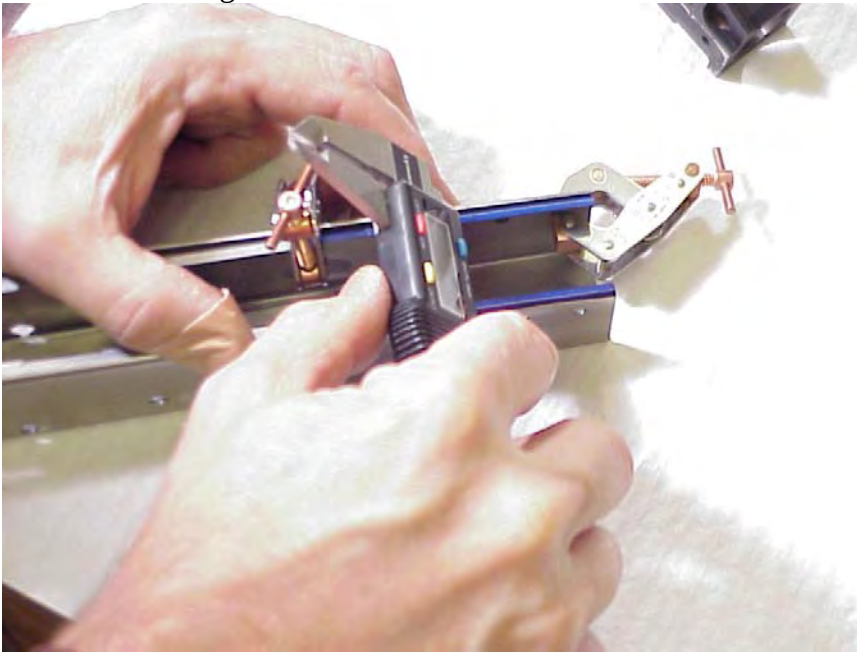
11. Measure the inside slots (this is where the upper rails will go into).



12. Subtract the second measurement (1.161") from the first (1.254"). I ended up with .093". Divide this number by 2 and you end up with .0465". Add the thickness of the receiver material, which in my case was .040" and my final figure is .0865".

13. Set your caliper to read .0865”.

14. As before, setup the flat stock to the receiver side and using the caliper set at .0865 “ scribe a line along the rail.



15. Accomplish the same operation on the opposite rail.

16. The completed job should look like this.



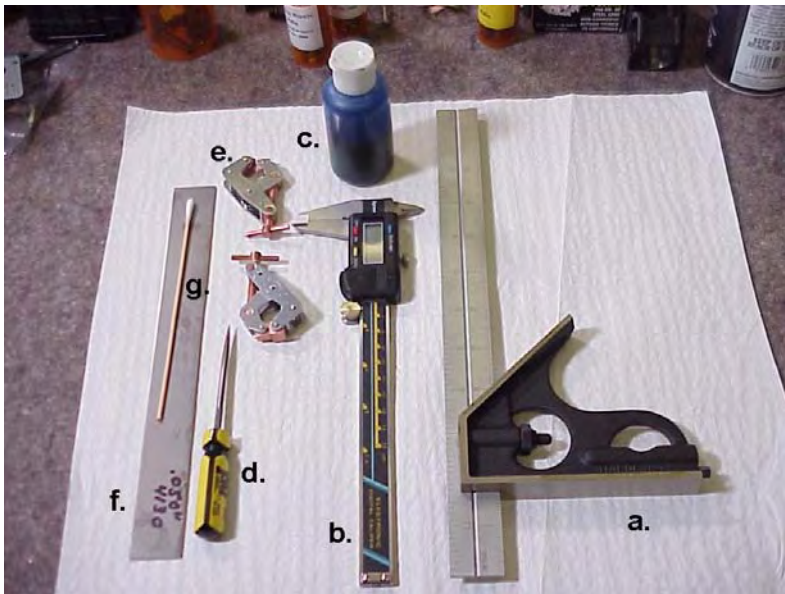
These marked areas will need to be removed to install the trunnions. After removing the marked areas, final fitting (by using the actual trunnion) will be required.

Layout of Receiver for Bolt Carrier Installation

Having already setup the receiver by temporarily securing the front and rear trunnions as well as the center support tube, these instructions will show how to layout the receiver for the installation of the bolt carrier.

1. Tools used for this operation are:

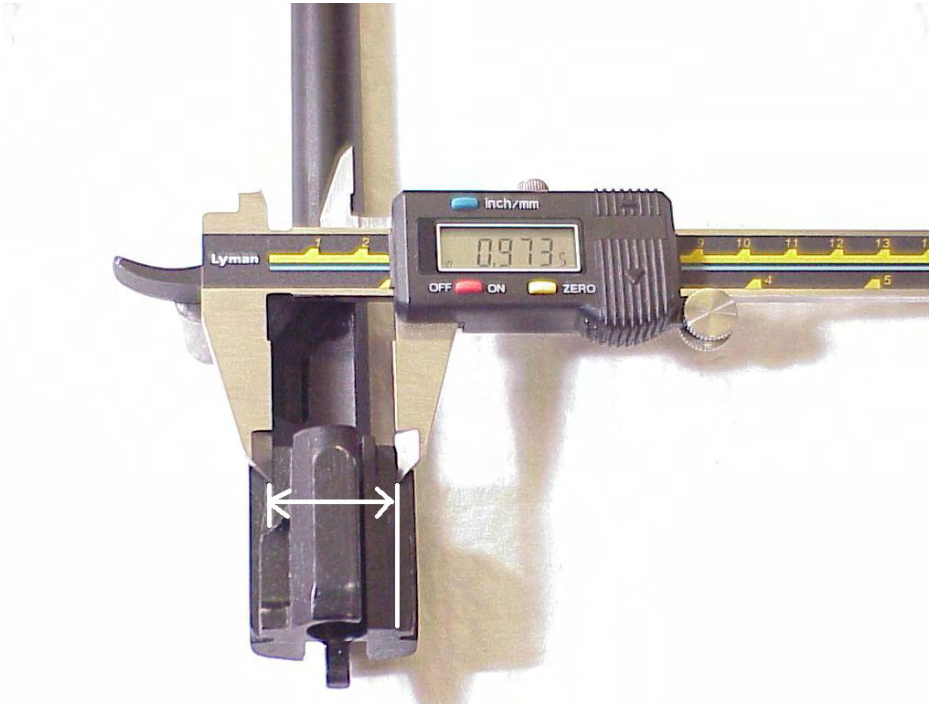
- | | | |
|-----------------|--------------------------|----------|
| a. Square | e. Small Clamps | g. Q-Tip |
| b. Dial Caliper | d. Scribe | |
| c. Layout Blue | f. .050" x 7" Flat Stock | |



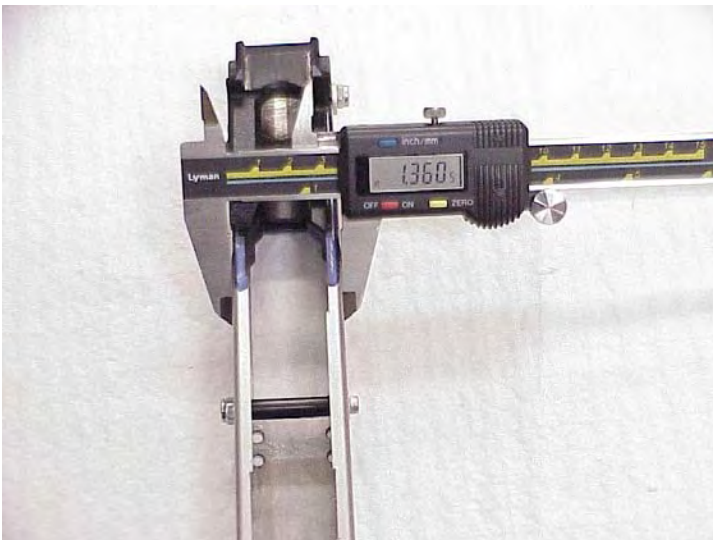
2. Apply Layout Blue to the upper rails.



3. Measure the Bolt Carrier Rail (minor). This one measures .9735”.



4. Measure the upper portion of the receiver at 3 locations (at least 3 locations). Near the front trunnion, above the center support and near the rear trunnion. Use bolts/nuts to secure the trunnions and center support (the trunnions and center support need to be temporarily installed prior to taking any measurements).



Near Front Trunnion (1.3605")



Above Center Support (1.3595")

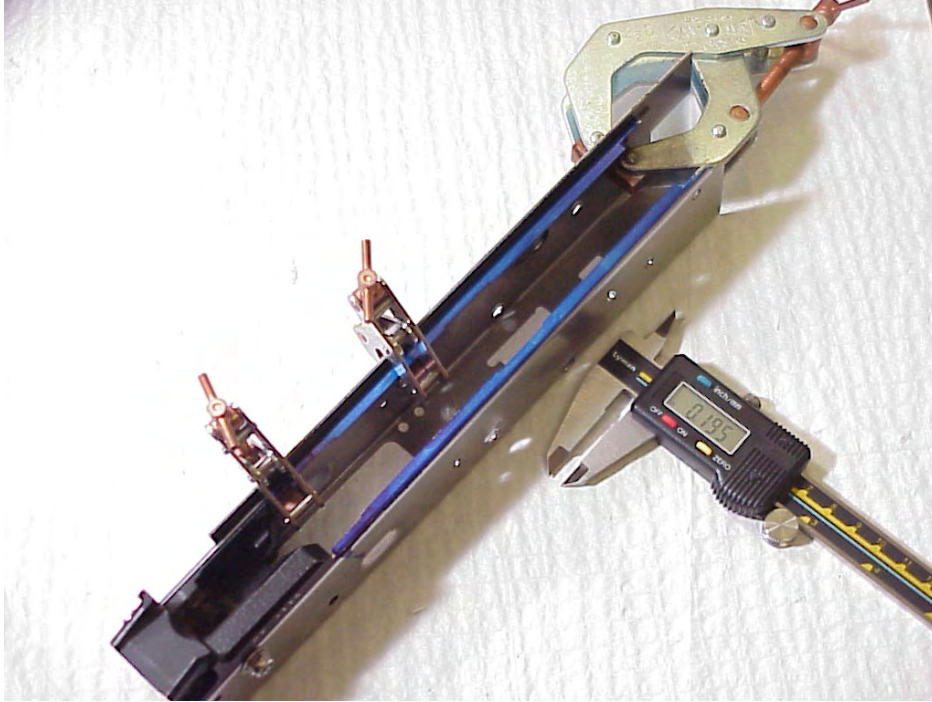


Near Rear Trunnion (1.3685")

5. Total all three (3) measurements (4.0875"), and divide by 3 = 1.3628" (1.363"). The measurement 1.363" is the average receiver width.

6. Subtract the measurement in # 3 (.9735") from the average receiver width in # 5 (1.363"). This measurement is .3895", divided this number by 2, and you have .1947" (.195"). This will be the dimension that you set the caliper to.

7. Set the caliper to .195" and install the flat stock against the side of the receiver, making sure that the flat stock follows the contour of the receiver closely (this is very important as the scribe marks will follow the flat stock). Clamp the flat stock at 3 locations as a minimum. For easier accomplishment (marking the top rails) you may remove the rear trunnion and center support tube.

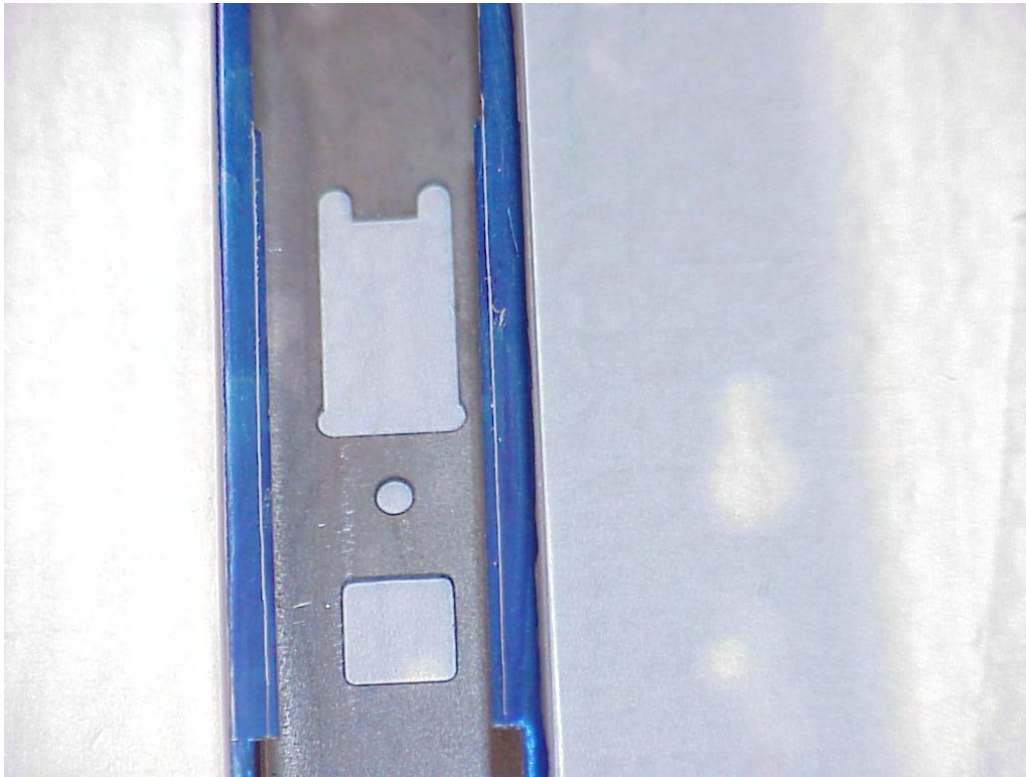


8. With the caliper scribe the Layout Blue marking the receiver.



9. Repeat the operation on the opposite side.

10. The receiver, marked correctly will look like this. The scribe marks run from the rear trunnion area to the front trunnion area.

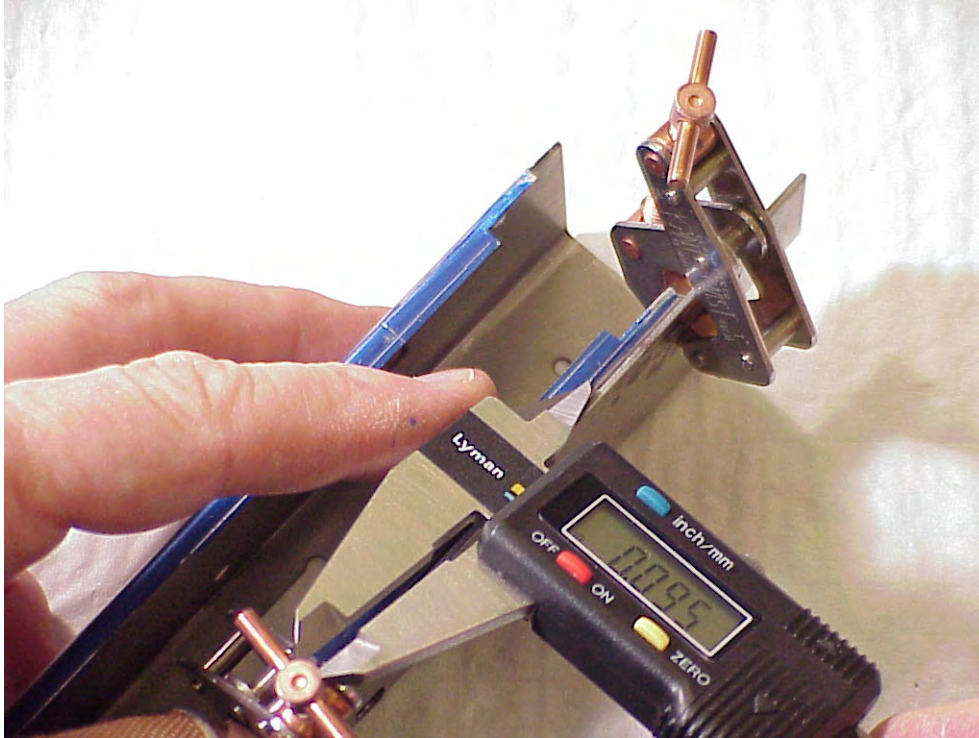


11. Measure the bolt carrier rail (major). This one measures 1.1735”.



12. Subtract the measurement in # 11 (1.1735") from the average receiver width in # 5 (1.363"). This measurement is 0.1895", divided this number by 2, and you have .09475" (.095"). This will be the dimension that you set the caliper to.

13. Install flat stock along side of receiver, set caliper to .095", scribe a line marking the receiver.



14. Measure the bolt carrier rail (major) length. This one measures .08485".

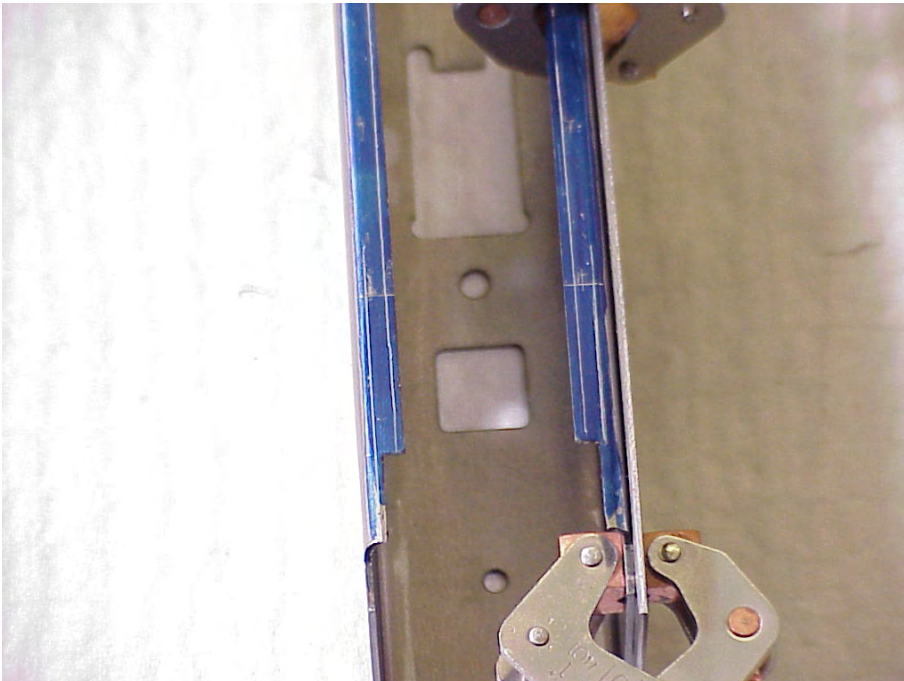


15. To allow the bolt carrier to slide into the upper rail easily, I add an additional .050" to the length measurement above. So you would have .8485" plus .050" which equals .8985". Round it off to .900" for total length.

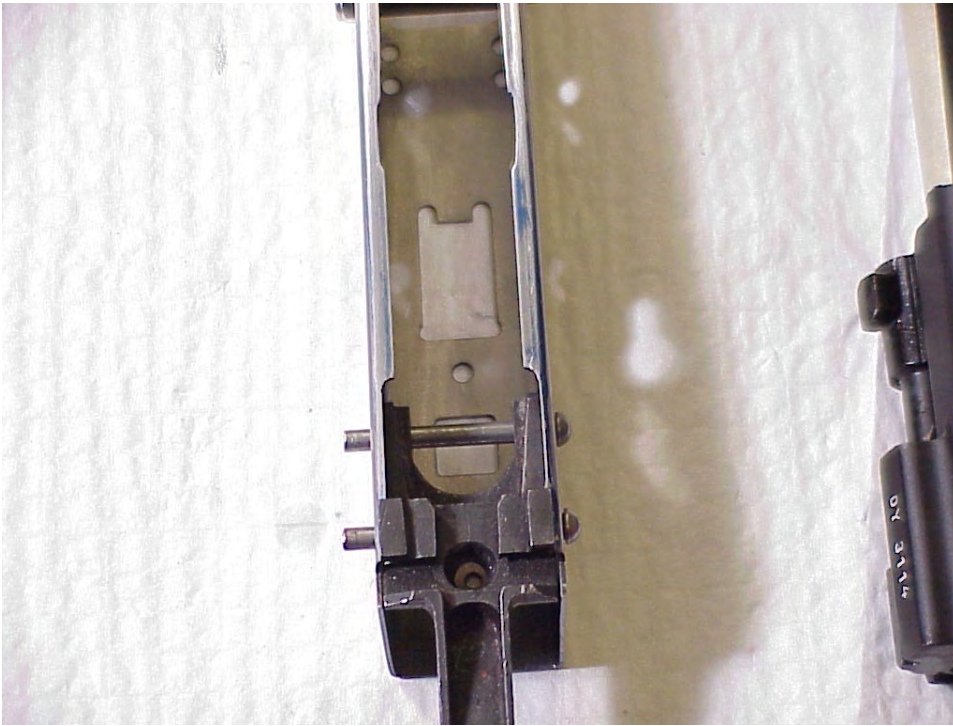
16. Set the dial caliper to .900". Using the depth portion of the caliper, line the square with the caliper depth rod and mark with a scribe.



17. The completed marking should look like this.



18. Remove the material along the scribed lines, use a file or other similar tool to fit bolt carrier for final finish. Temporarily re-install the center support tube and rear trunnion. The bolt carrier should move freely the length of the receiver.



Receiver with carrier rail slot cuts.



Receiver and bolt carrier.

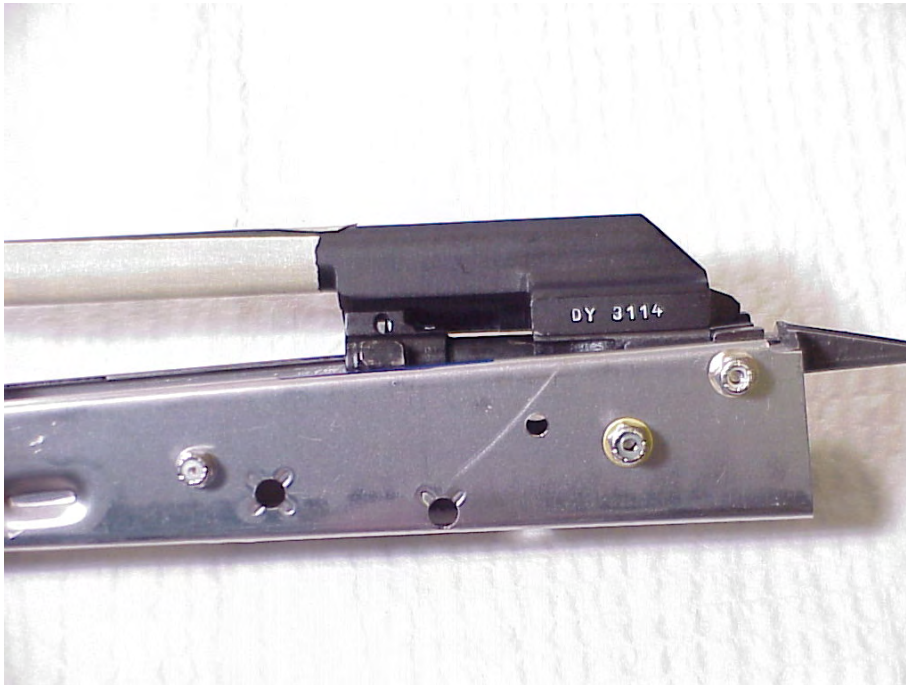


Bolt carrier installed in receiver and checked for smoothness of operation.

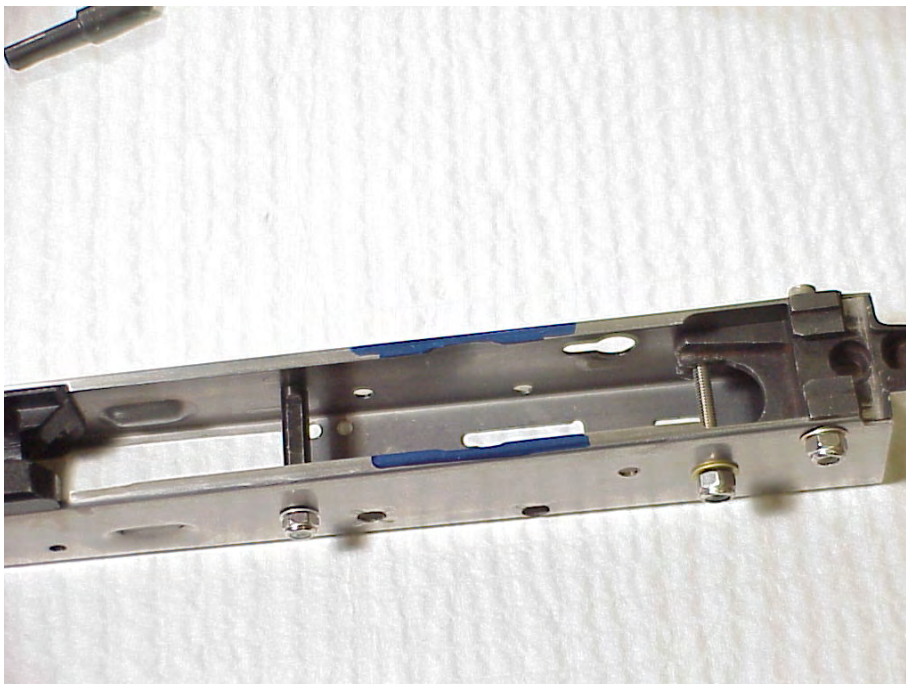
19. Install the bolt into the bolt carrier. Tape is used to protect finish on carrier and front trunnion.



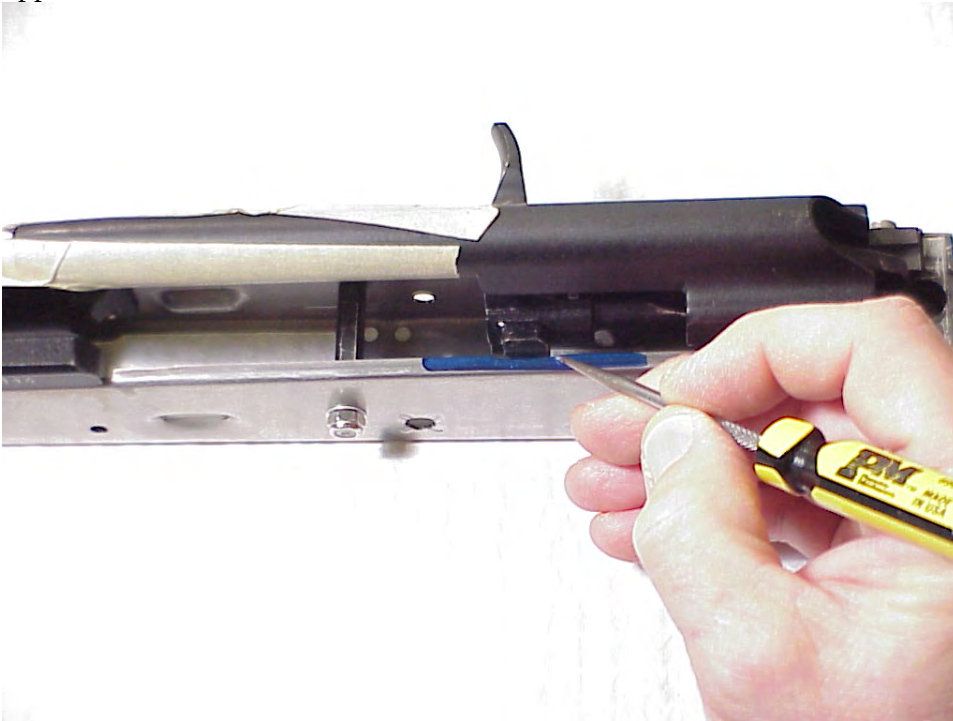
20. Insert the aft portion of the carrier into the aft slots. Because the bolt is in the carrier it will not sit flush.



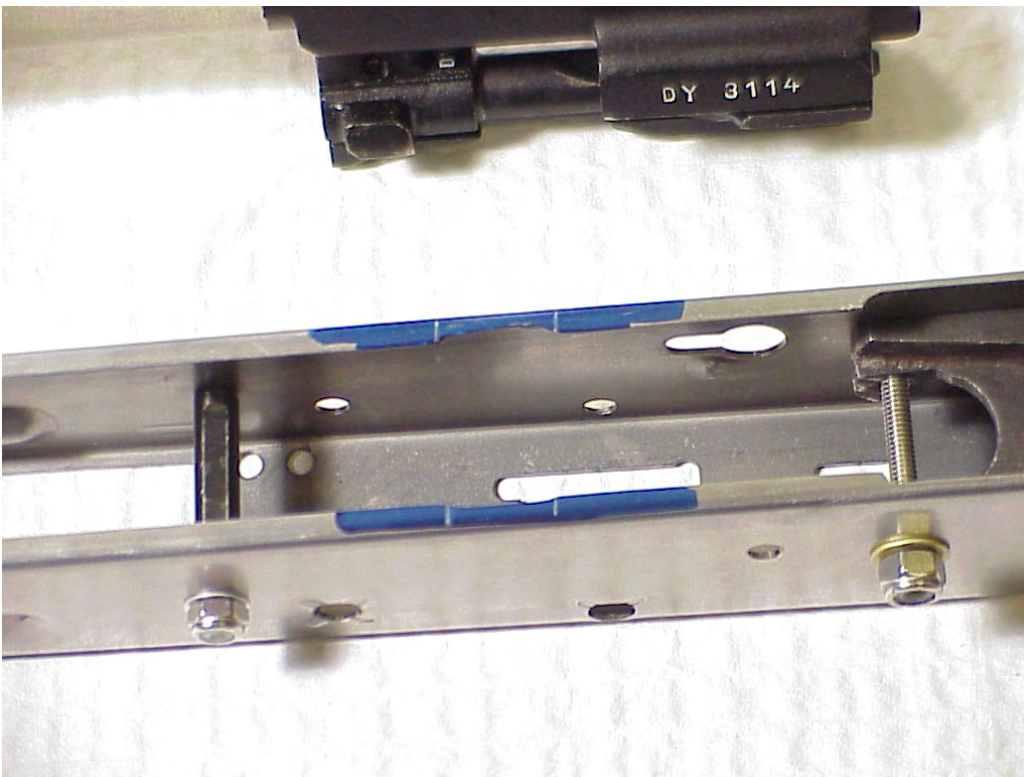
21. With layout blue, mark the area where the bolt rest on both of the upper rails.



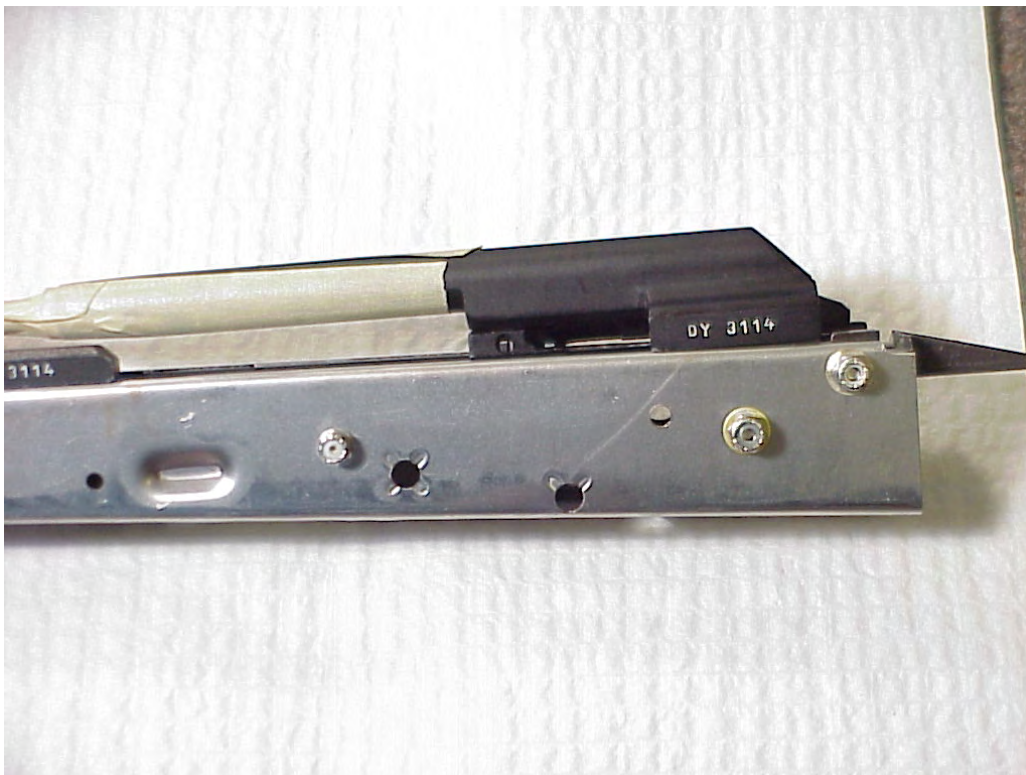
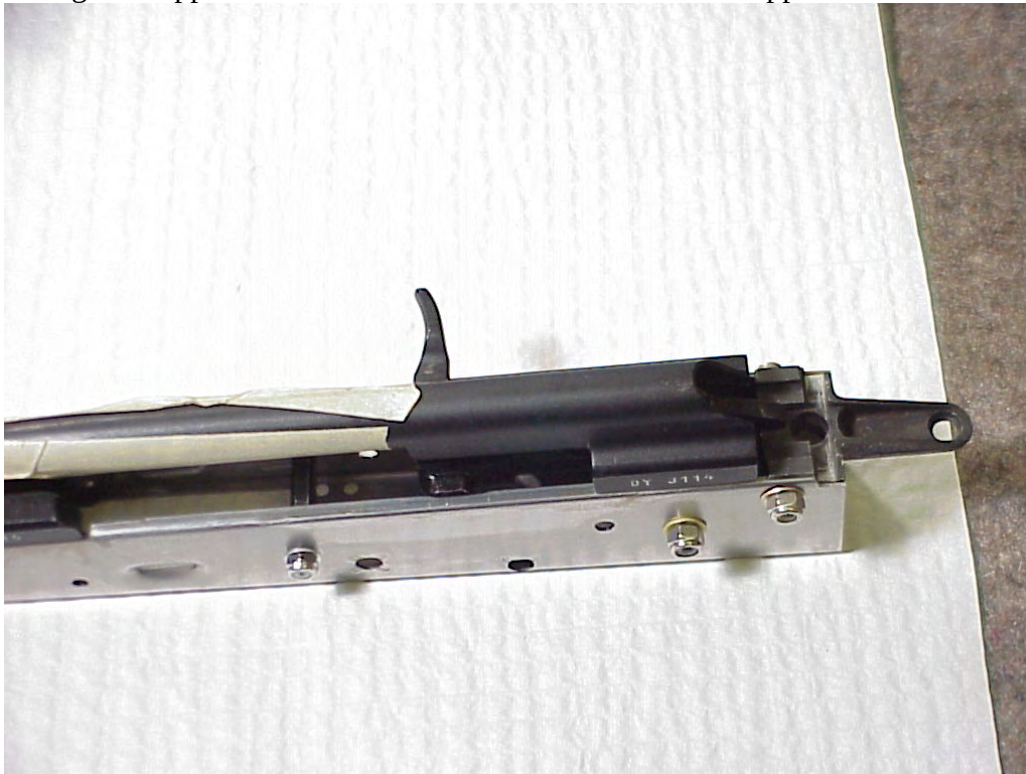
22. Re-install the bolt carrier assembly as in # 20 and scribe where the bolt rests on the upper rails.



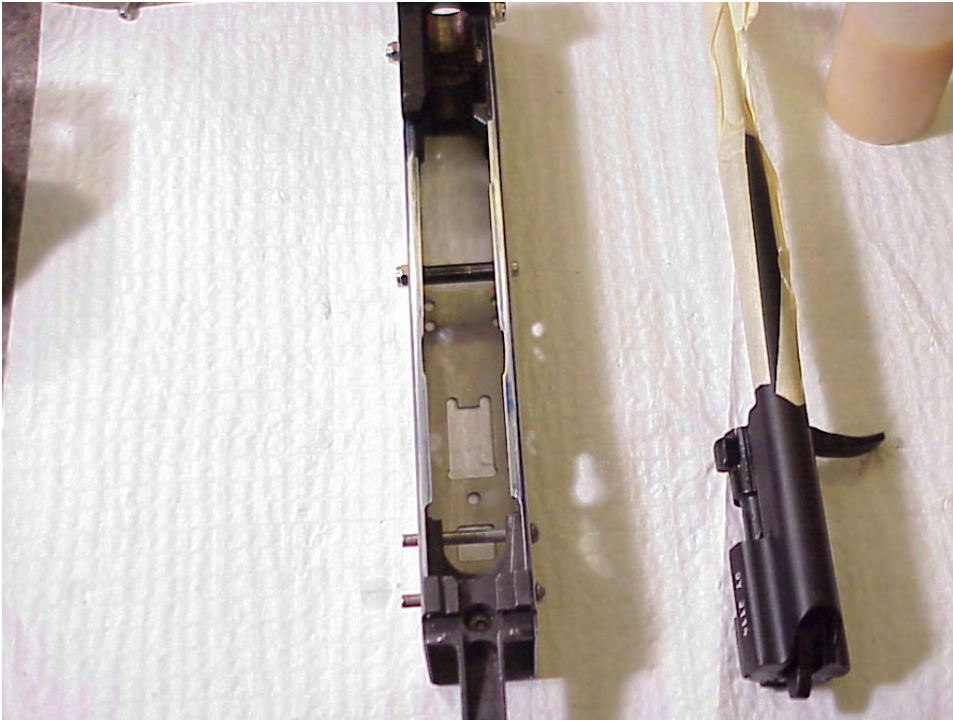
23. The scribed areas should look like this.



24. Carefully remove material between the lines on both upper rails until the bolt passes through the upper rails and the bolt carrier sit flush on the upper rails.



25. Completed upper rails with carrier and bolt head slots.



25. Clean off all traces of layout blue, install the bolt carrier with bolt and check for smooth operation. As a note, since the lower rails are not installed the bolt might turn slightly during checkout causing some alignment problems. Make sure when checking bolt carrier movement that the bolt is straight.

Layout for Center Support Tube Installation

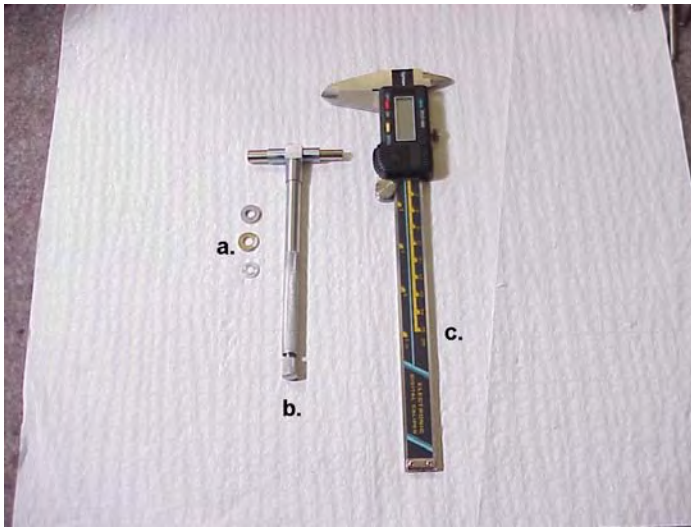
This information will provide you with the “how to” of laying out the receiver for the center support tube installation (as well as getting the receiver prepared for the installation of the bolt carrier). As stated in previous tutorials, there are other ways for accomplishing this task, this is just one of them.

1. Tools used for this operation.

a. Washers/Shims

b. Telescoping Gauge

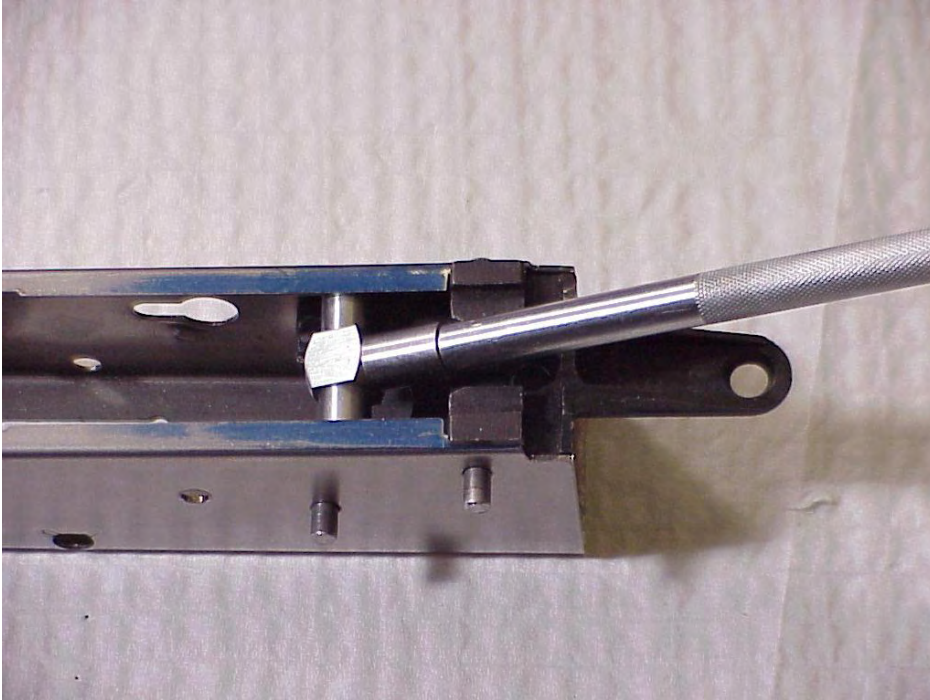
c. Dial Caliper



2. After removing the material from the receiver for the front and rear trunnions (see Front and Rear Trunnion Layout), final fit both trunnions and temporarily install using bolts/nuts or slide rivets through trunnions.



3. Using the telescoping gauge, insert near the rear trunnion upper rail.



4. Using the dial caliper, measure the gauge distance. This measurement indicates 1.293”.



5. Again using the telescoping gauge, insert near the front trunnion upper rail.

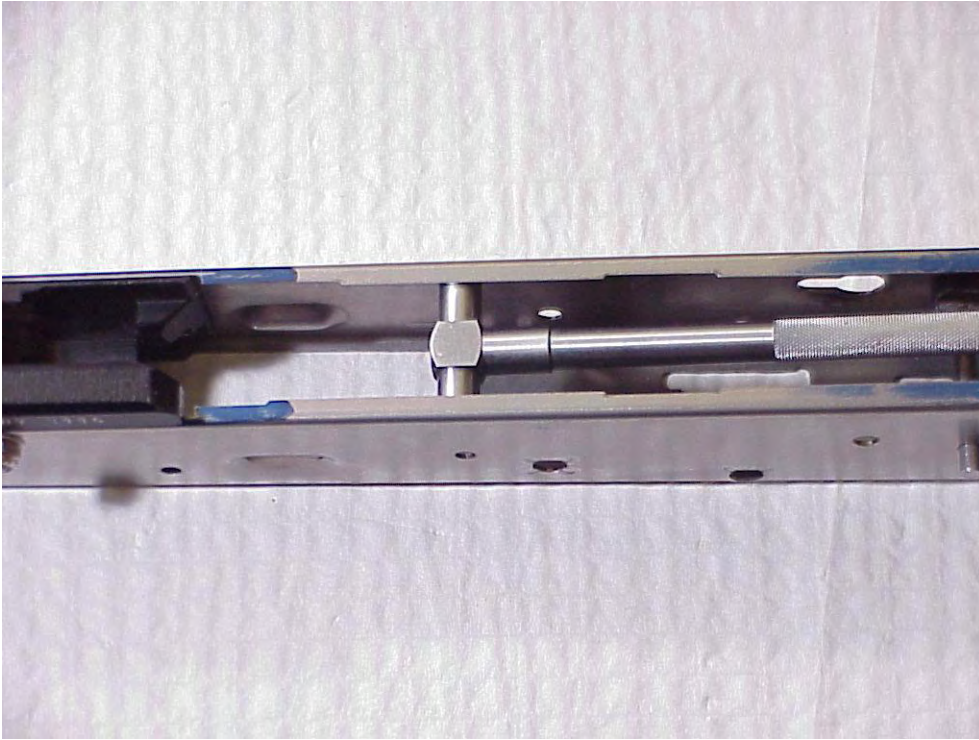


6. Using the dial caliper, measure the gauge. This measurement indicates 1.292”.



7. In taking the measurements, we have learned that there is a .001” difference between the two (2) locations.

8. Again using the telescoping gauge, insert at the top rail, above the center support hole(s).



9. With the dial caliper, measure the gauge. This indicates 1.2895”.



What we are doing by taking these measurements is ensuring that the distance from one side of the receiver to other is fairly consistent the length of the receiver. Since the measurements at the front and rear trunnions are fixed, the one area we need to ensure that measurement is as close as possible is at the center support. We do not want the receiver upper rails to bow out or in at the center support. To me, a tolerance of .004 - .006 is acceptable (which would mean .002" - .003" on each side of the receiver). This means that you should have no more that a .006" difference between the average measurement at the front and rear trunnions and above the center support hole (s). Remember that these measurements were taken at the upper rail. If the measurement exceeds that tolerance you will either have to push in or pull out at the upper rails above the center support holes.

10. The difference between the spacing of the front and rear trunnion and the upper center support area is .003" which is acceptable.

Now we must install the center support so that we will have all three (3) of the riveted areas (front/rear trunnion and center support) secured. This is in preparation for installation of the bolt carrier.

11. You will need to take a measurement of the center support tube. This tube measures 1.174".



12. Measure the LH lower rail thickness. This measures .0685”.

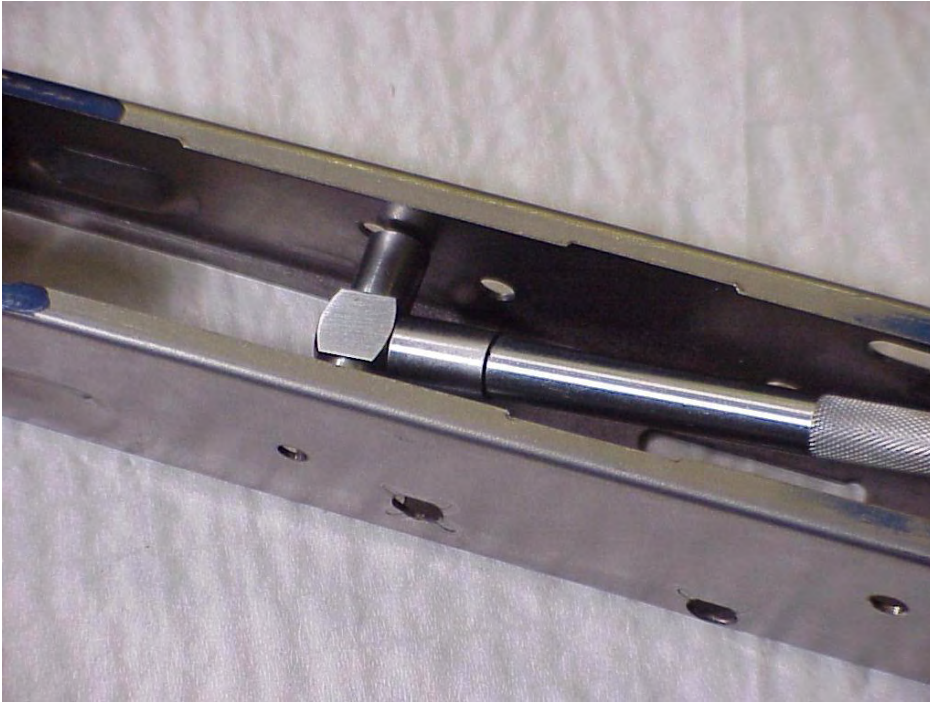


13. Measure the RH lower rail thickness. This measures .041”.



14. Add #11, 12, and 13 together. The total comes out to 1.2835”.

15. Again using the telescoping gauge, insert near the center support rivet holes. Do not allow the gauge to index on the holes.



16. Using the dial caliper, read the gauge measurement. This measurement indicates 1.2625".



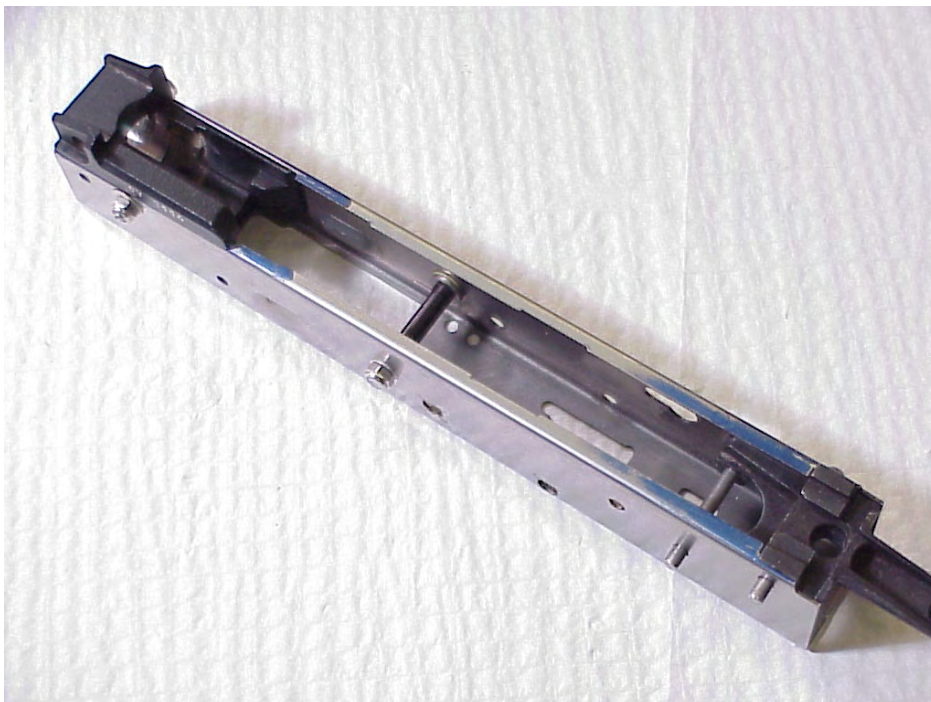
17. Subtract the total from # 16 (1.2625") from the total on # 14 (1.2835") and you will have .021".

So this means that the center support tube along with the LH and RH lower rails measure a thickness greater than the distance between the sides of the receiver. So approximately .021" will need to be removed (not at this time) from the center support tube. This will allow the installation of the center support without a bowing in or out the sides of the receiver. If the measurement was less than the distance between the sides of the receiver a thin washer/shim or new center support tube of longer length would need to be used.

18. Using the measurement from # 16, add washers or shim stock to the center support tube to obtain the measurement as close as possible.



19. Insert the washers/shims and center support tube into the receiver and using a bolt/nut, secure.



At this point the front and rear trunnions plus the center support tube are temporarily installed. You are now ready to layout the receiver for bolt carrier installation.

Lower Rail Installation

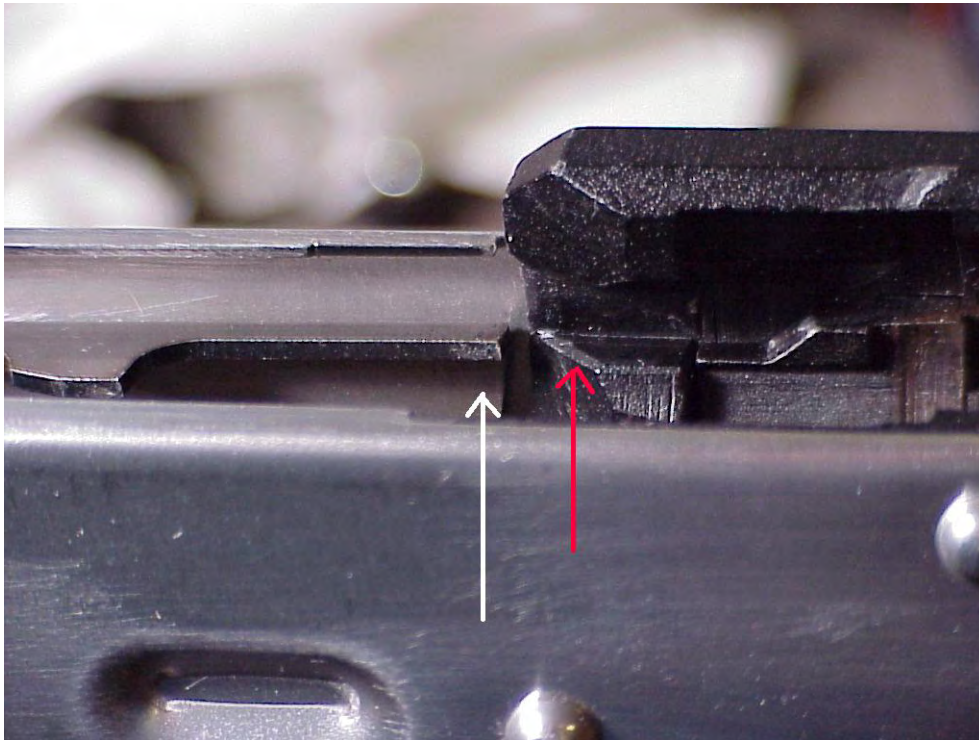
Part 1

This tutorial shows the installation of the lower rails in an AK-47/74 type rifle. The measurements given are for this particular installation and are not standard. Some pictures may have been taken from a previous build but are applicable here. Always use proper eye protection...PPE (Personal Protection Equipment) is a must!!!

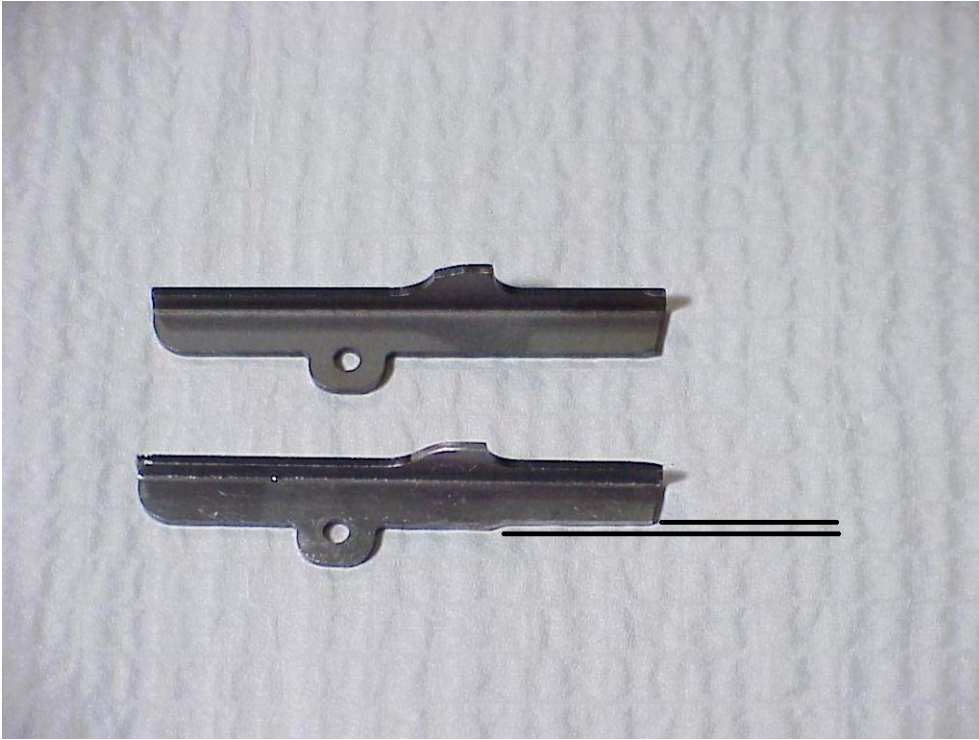
Lower rails come in different configurations. Some have holes drilled (center support and hammer axis pin) others don't. Some of the holes are the correct size, others aren't. Some rails have magazine supports on both rails others only have the support on the RH rail and others have no magazine support at all. So trying to show how all of them are installed is beyond the scope of this tutorial.

What is provided is a generic tutorial on lower rail installation. Also this installation is using a TAPCO bent flat and the rails that came with it (center support and hammer holes were pre-drilled and were correct is diameter).

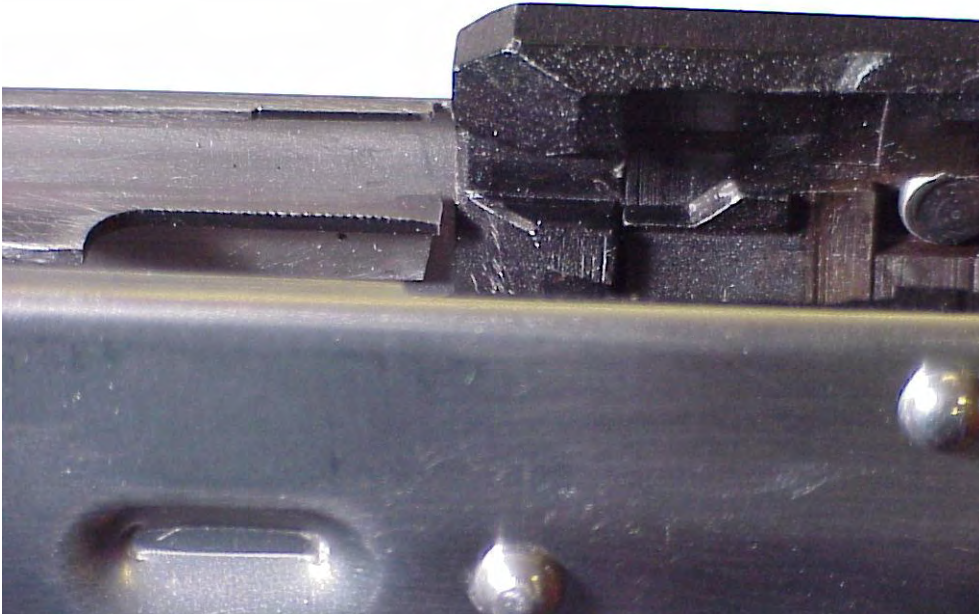
1. Insert the LH rail into position and slide the center support rivet through the receiver/rail/receiver. On this installation the lower portion of the rail contacted the magwell dimple and prevented the rail from aligning with the front trunnion bolt guide.



2. To allow the rail to align some material had to be removed from the lower portion of the rail. Approximately .035" was removed.



3. After removing .035" from the rail, it aligned.

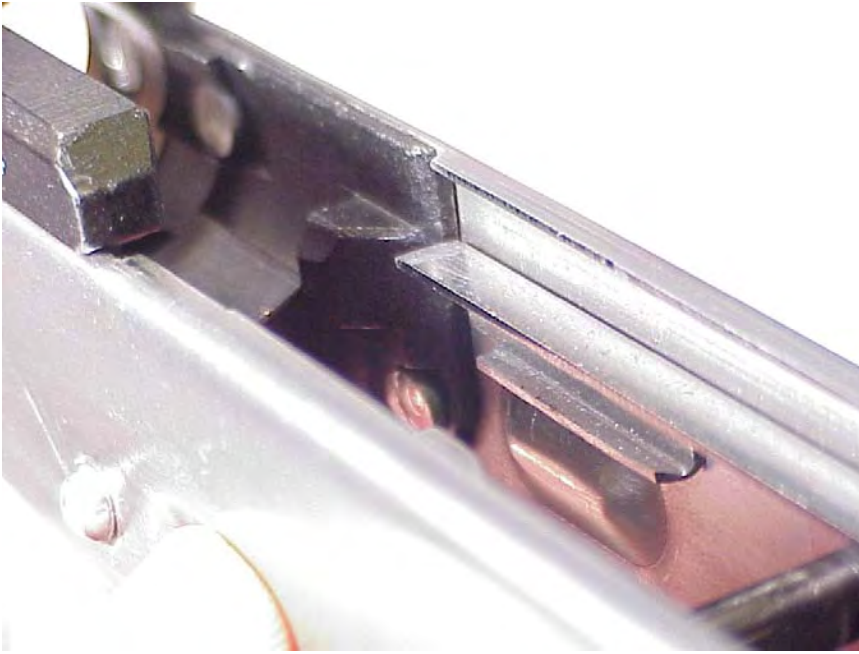


4. To check for proper alignment the length of the rail a “G” (.261”) drill was placed on top of the rail. The use of the drill will determine correct rail to front trunnion bolt guide alignment. If necessary, carefully enlarge the rail hole so that the center support rivet passes through.



5. Repeat the above for the RH lower rail. The drill used on the RH rail to check for proper alignment was an “H” (.266”) drill bit. The difference between the drill used in step # 4 and here is only .005” which is acceptable. On some builds, I have had an “F” (.257”) drill on one rail while the other rail needed a “J” (.277”) drill for correct alignment without any ill effects. The important thing is that both rails align with the front trunnion bolt guide, regardless of what drill is needed for the alignment.





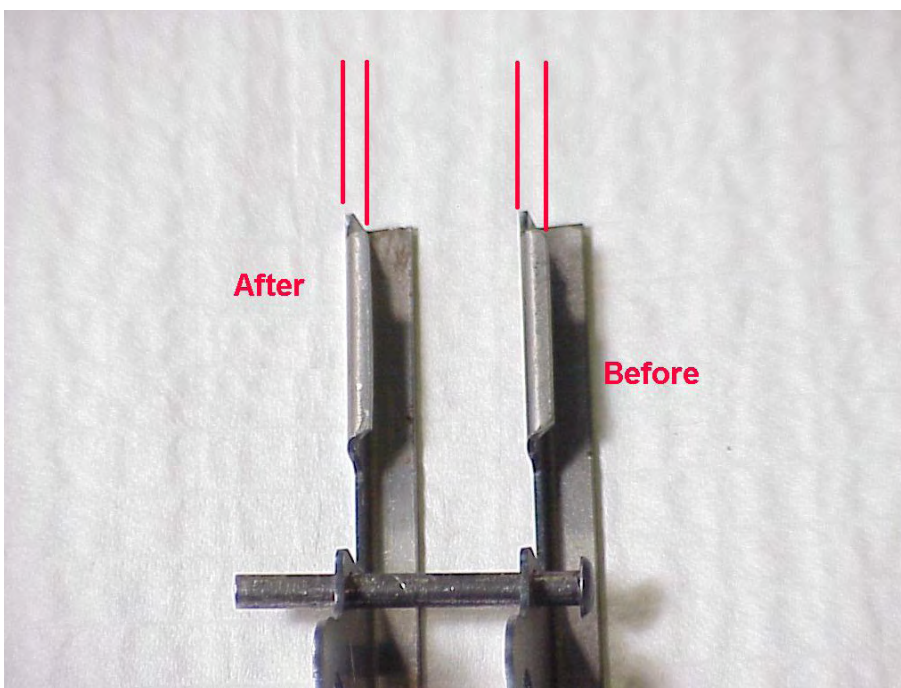
6. Insert both rails and the center support using the center support rivet. The center support should fit nicely without causing the receiver to bow in or out. After the lower rails and center support are in alignment remove the rivet and insert a bolt/nut to hold everything together. Before tightening the bolt/nut make sure that the rails are aligned with the front trunnion bolt guide.



7. It must be noted that on this build, without the rails installed the magazine was a very good fit and didn't wobble at all. Now you need to check the magazine to lower rail magazine support clearance. Try to insert the magazine fully into the magwell (do not try to force the magazine into position). On this operation the RH rail magazine support was too wide and needed to be trimmed (the LH rail didn't have the support) to allow the magazine to fit correctly. In this picture you can see the front of the magazine hitting the RH rail magazine support.



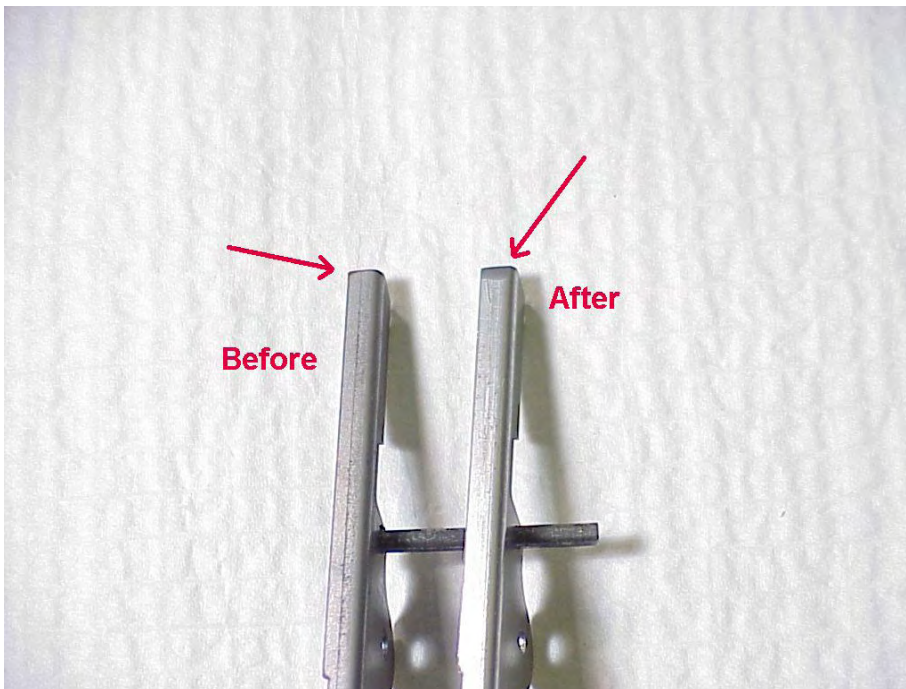
8. The RH rail magazine support was trimmed to allow the magazine to fit correctly. This is a trim a little, check, trim some more type operation. You just want to remove enough that the magazine can be inserted fully. The magazine support measured .148" before trimming and .128" after trimming. So .020" was removed from the magazine support to allow the magazine to clear.

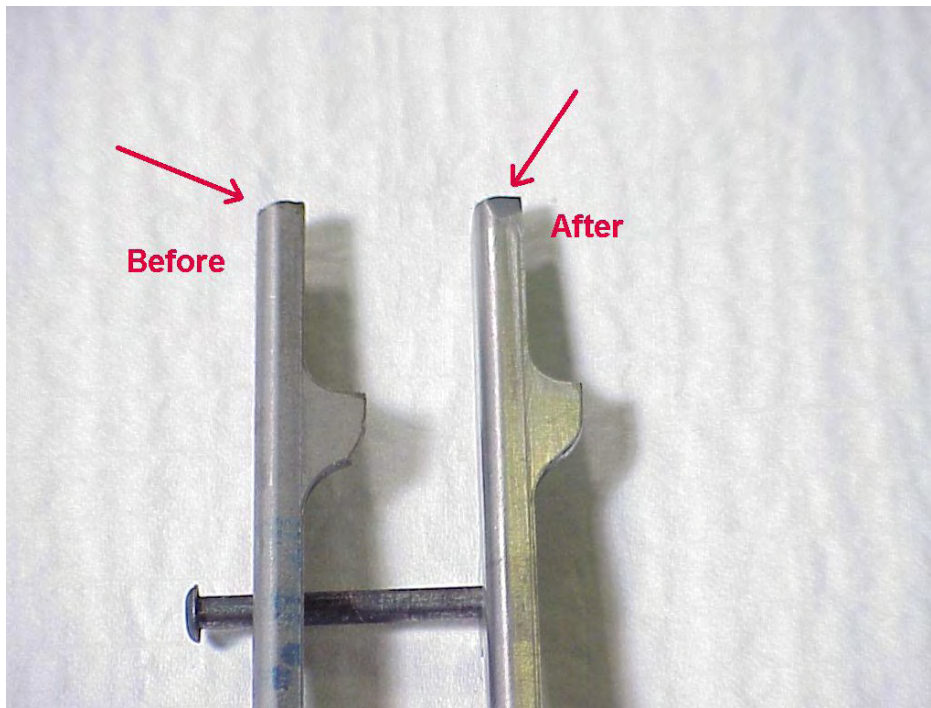


9. With the magazine support properly trimmed the magazine could be inserted fully. The fit was very nice, no magazine wobble.



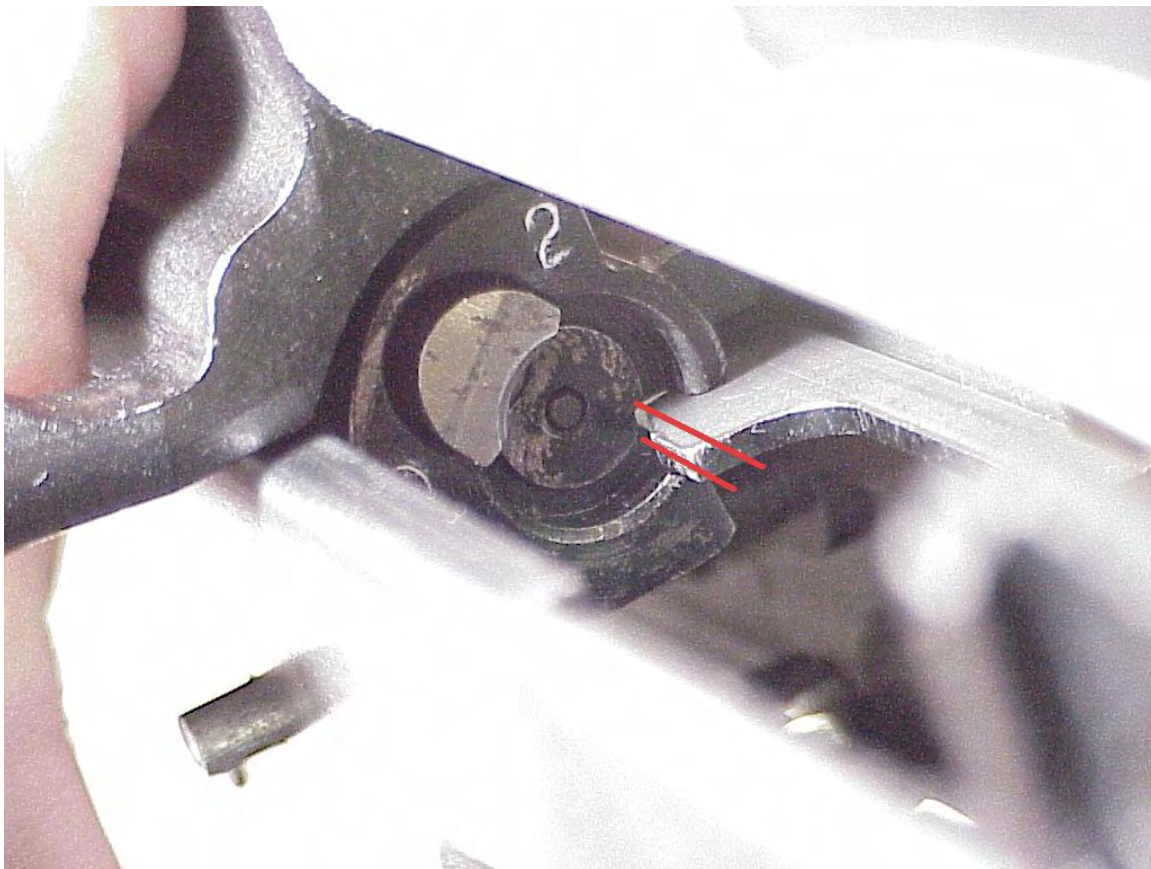
10. To ensure a smooth transition of the bolt from the rails to the front trunnion bolt guide under all conditions, I angle the forward edge of each rail. This step isn't absolutely necessary but just makes things work a little smoother. The first picture is the RH lower rail, the second picture is the LH lower rail (ejector).



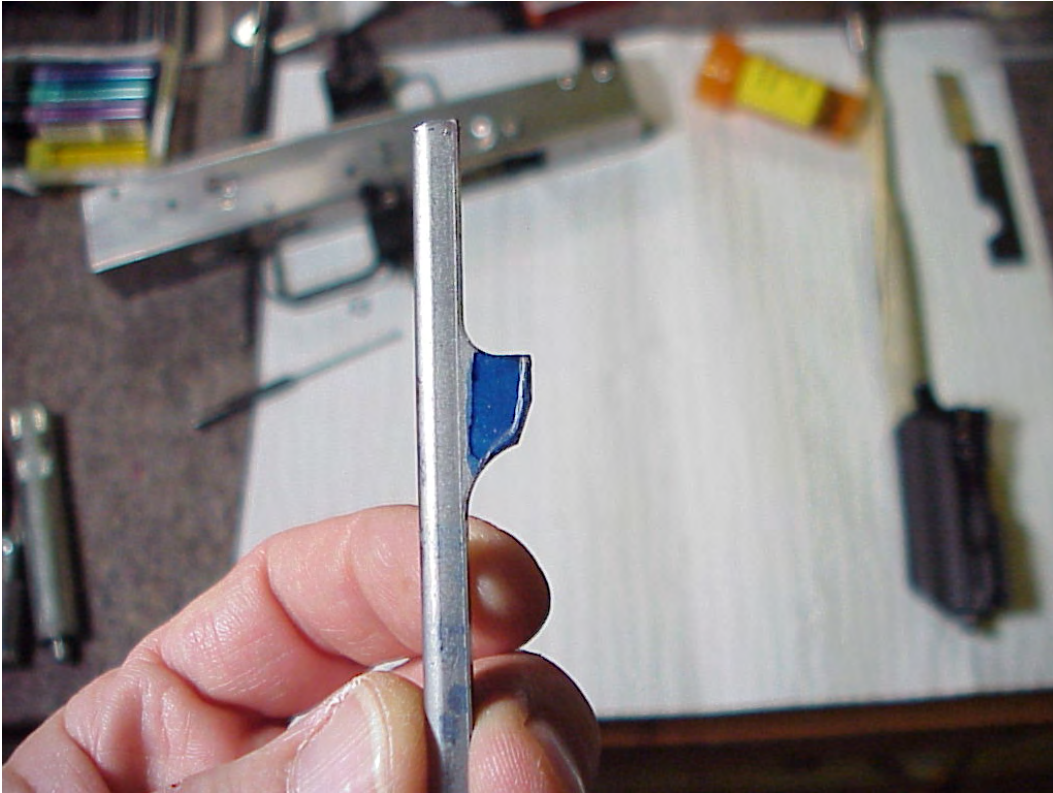


11. Re-install both rails and center support like in step # 6.

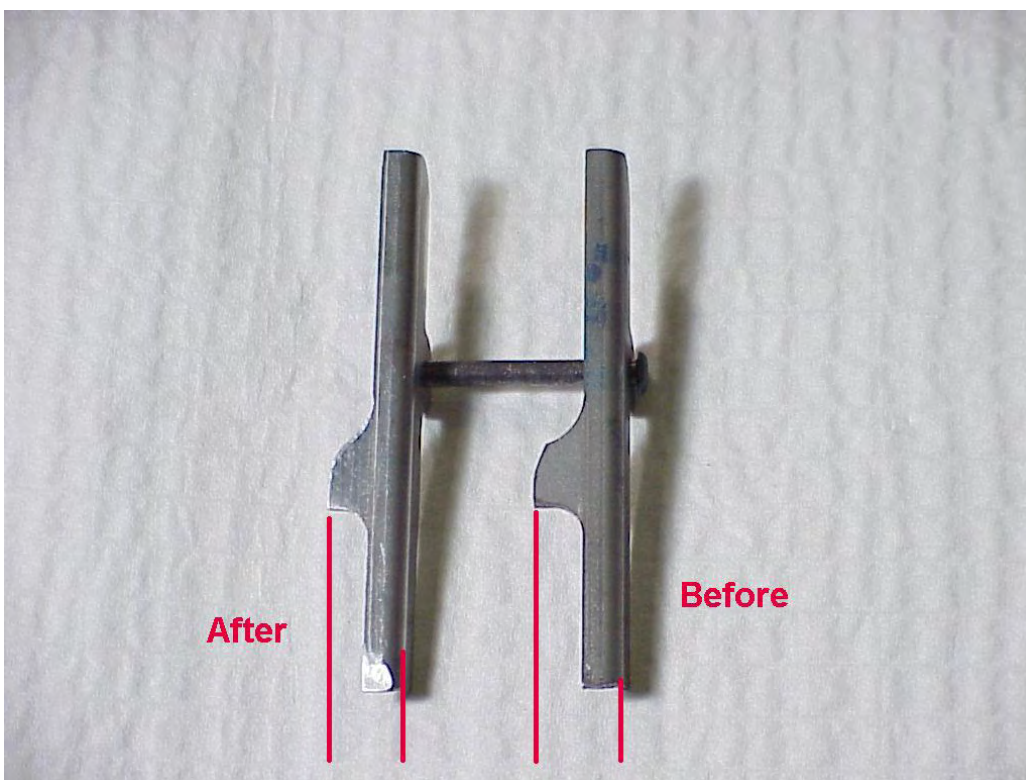
12. Insert the bolt carrier with bolt into the receiver. Slide the carrier forward (carefully) until the bolt hits the ejector (most ejectors need to be trimmed). Carefully mark where the bolt and ejector meet.

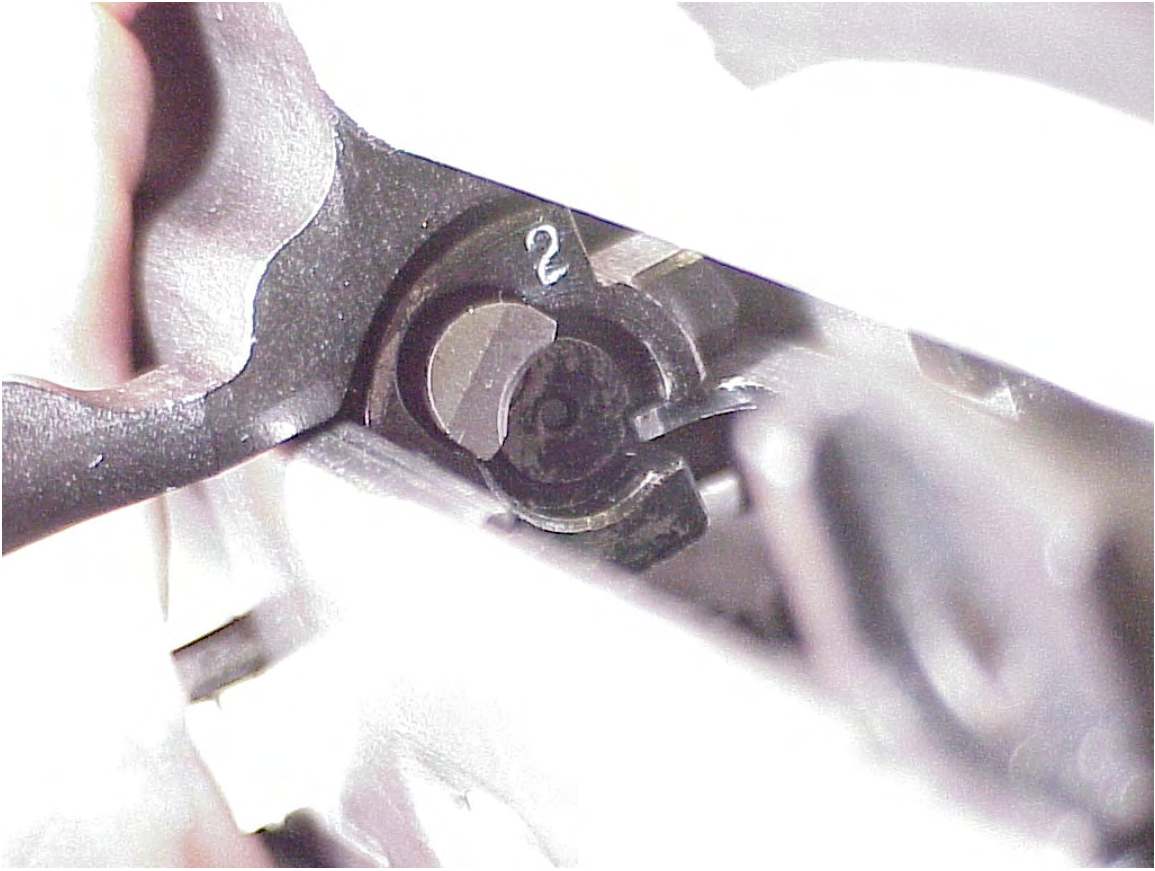


13. Remove the rails and center support. With a Dremel tool **slowly and carefully** remove material to just a head of the mark (we need to go slow here).

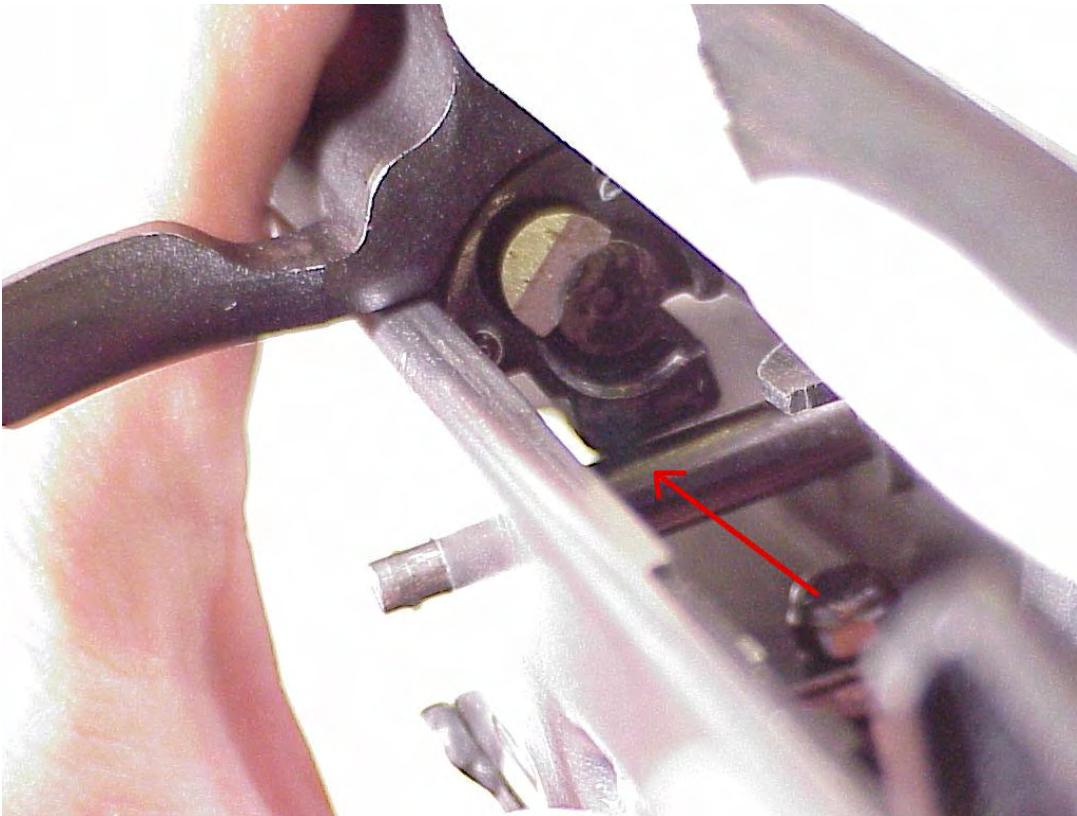


14. Re-install the rails and center support, insert the bolt carrier with the bolt and check to see if the mark made in step # 12 is correct. Remove material as necessary (carefully) until the bolt carrier and bolt slide easily past the ejector. On this operation the ejector measured .534" before trimming and .491" after trimming. So a total of .043" material was removed from the ejector.





15. It was noted that during the fitting of the ejector the bottom of the bolt would graze the center support.



16. Since the K-VAR center support has a flat milled on it, the flat was rotated upward so the flat was matching the lower part of the bolt. A small amount of material was removed for additional clearance.



17. The work accomplished in step # 16 provided enough clearance for the bolt as it moves forward past the ejector. Note: This is just some of the additional work that might be needed during a one-off build.



End of Lower rail Installation Part 1

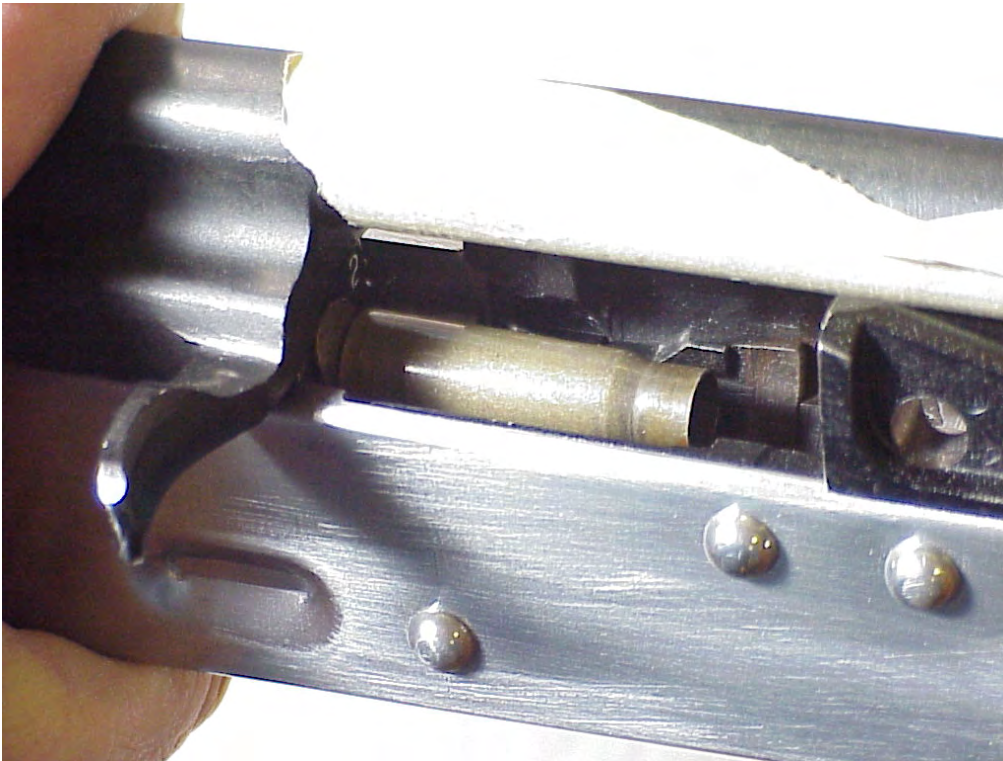
To continue with the installation of the lower rail, close this viewing and select Lower Rail Installation Part 2.

Lower Rail Installation

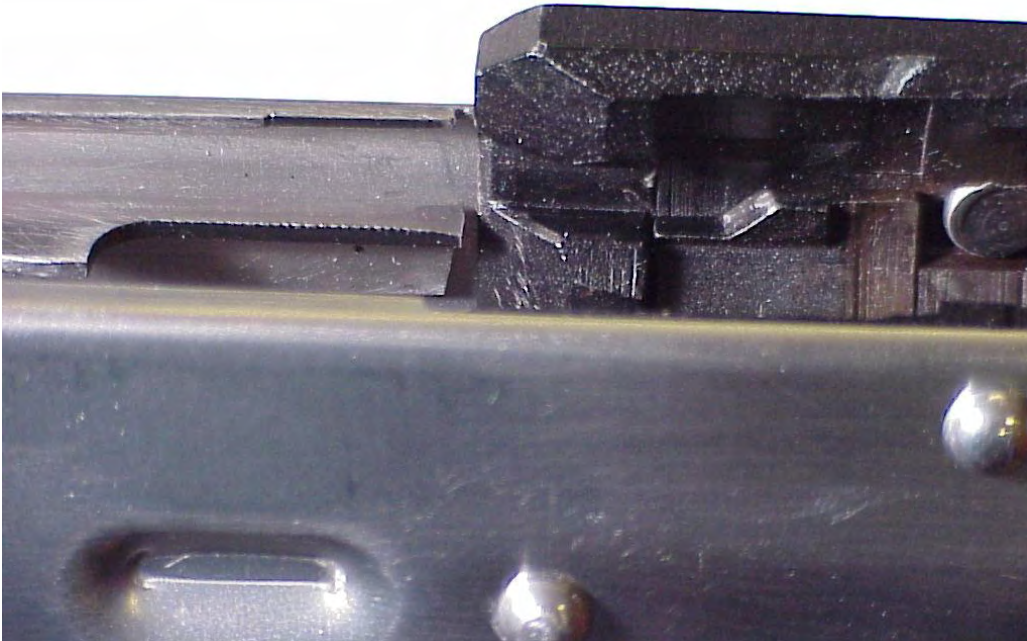
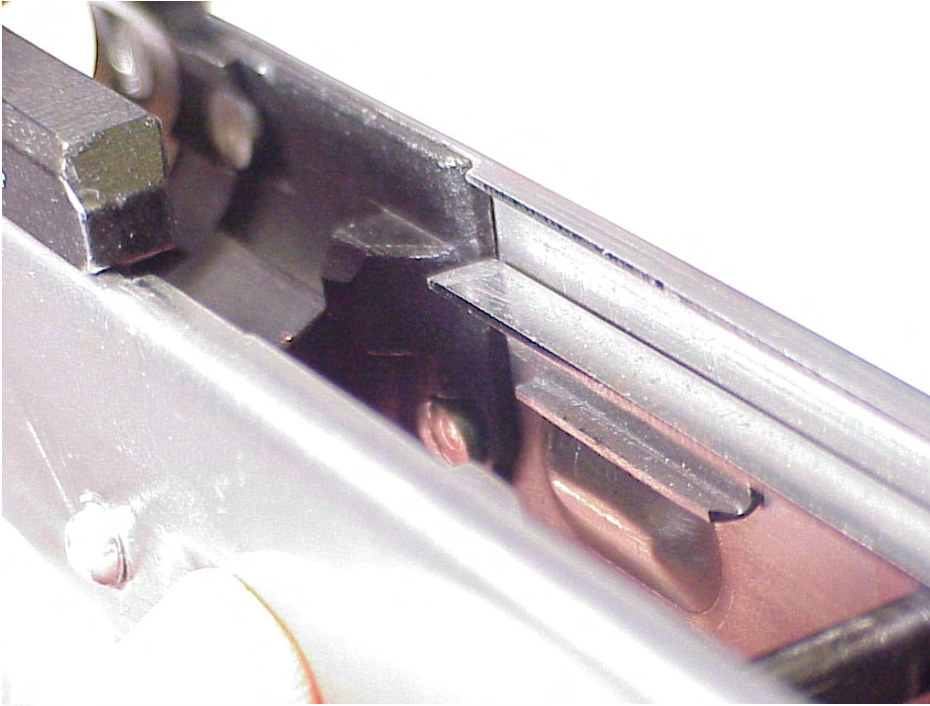
Part 2

Continued from Lower Rail Installation Part 1

18. As a final check before spot welding the rails in position, I check for proper ejection of an empty casing. With the rails and center support temporarily installed and the case being held by the extractor, pull the bolt carrier back briskly. The empty casing should eject up and out to the right.



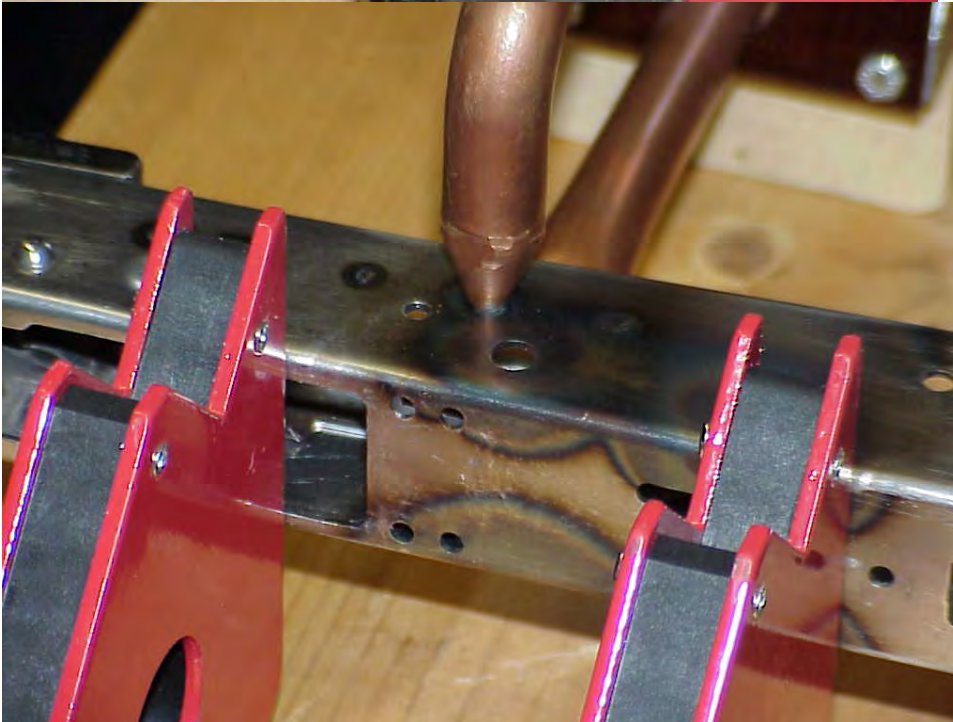
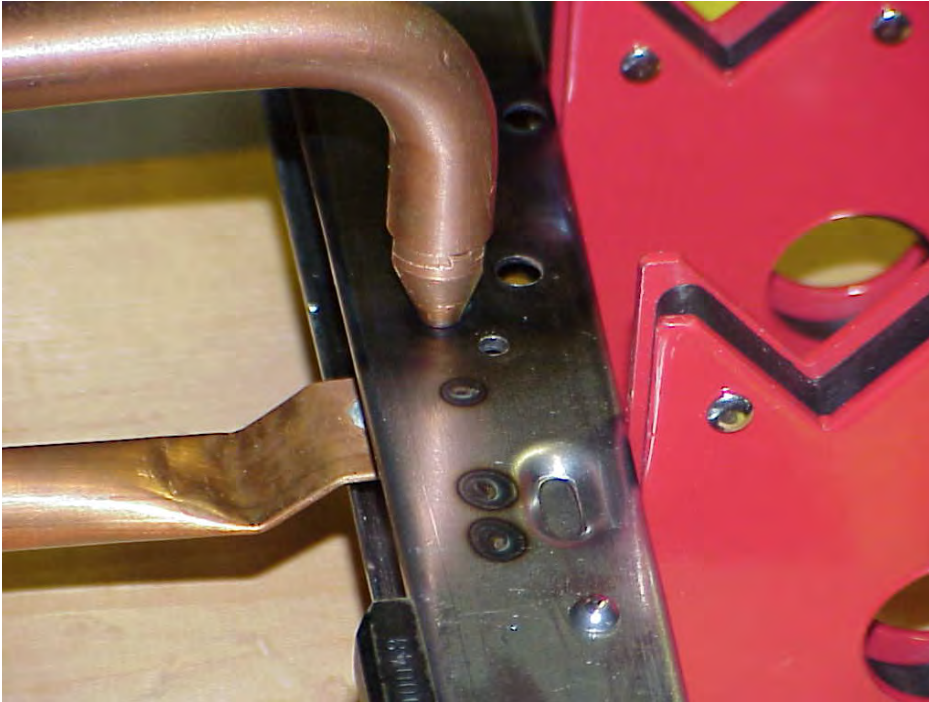
19. Ensure the rails are properly located, that they are in correct alignment with the front trunnion bolt guides. Insert the bolt carrier with bolt and carefully move the carrier forward till the bolt rotates in the front trunnion. Then slowly pull the carrier to the rear and remove. The carrier should glide smoothly the entire distance. This step is just insurance that the rails are in correct alignment. Be sure to make this check, as welding the rails out of alignment will cause an undue amount of trouble. Basically, once welded in place, they're welded in place.



<<<IMPORTANT>>>

As a minimum, heat treat the ejector, the hammer/trigger holes (4). In addition, if so desired, heat treat the LH small selector hole and the top of the lower rails. **THIS MUST BE ACCOMPLISHED PRIOR TO SPOT WELLDING THE RAILS IN PLACE.**

20. Position the spot welder so that the receiver and rail to be welded are level and that the welding tips are in proper position. When ready, I hit the switch for about three (3) seconds, wait till the weld has cooled then disengage the welder tong and move on to the next weld. The red items in the pictures are magnetic welding squares that hold the work in almost any position for welding setup.



21. I usually put 4 welds (evenly spaced) on the LH rail (ejector) and five (5) welds on the RH rail (4 welds in a row with 1 weld low and above the hammer axis pin hole).



After all spot welds are completed, insert bolt carrier with bolt and move the carrier forward till the bolt rotates in the front trunnion. This operation should be as smooth as when accomplished in step # 19. This completes the lower rail installation.