

BUILDING ACCURATE ARs

BY STEVE ADELMANN
Copyright 2008

Like most married men, I've learned that combining my passion for something with the joy of giving doesn't always end well. Giving power tools to my wife is a good example; camouflage clothing is another. However in late 2007 my lovely wife made a whopper of a request: she wanted an AR-style rifle for Christmas. In this case giving something I'd enjoy having was going to be a win-win. After coming down from my high, the next step was deciding what to

buy her. There are so many AR configurations and chamberings to choose from (45-50 and counting) that selecting just one can be daunting. Like a stymied kid trying to choose just one jellybean from a candy dish, a month later I still had no plan. While frantically searching the aisles of a local gun show I happened upon a table of AR receivers and had an uncharacteristically good idea: build it myself. I figured I could buy some parts, give them to her in a box and eventually decide what flavor it should be. That would have made a lot of sense were it not for the fact

that although I'd carried and shot ARs of all shapes, sizes and styles, since I was 17, I'd never taken one down past basic field-stripping. I knew a lot about how to employ them and a little about what makes them tick, but that was it. When I presented her with a stripped upper and lower receiver set on Christmas morning, it was with the assurance that I'd have it built "in no time at all". Thus began my odyssey into the deep and cavernous world of custom AR building. So far I've learned several key lessons:

1. Building and customizing ARs is a rewarding challenge I thoroughly enjoy.
2. Even an idiot can build a fully functional AR (see #1).
3. AR-style rifles are the most versatile modern firearm platform available.
4. Good material selection, attention to detail, and solid technique can yield very accurate rifles and carbines.



The Varmint/Match rifle configuration that's a consistent performer uses heavy 20" barrels, 2-stage match trigger, rifle-length gas systems and adjustable pistol grips/stocks. Thus far it's been a good combination for accuracy and reliability. Photo courtesy of Rifleman Consulting LLC.

I configured that first gun as an accurized 5.56x45mm carbine out of both utility and curiosity. A carbine best suited her needs and I

wanted to see how well the product of my unskilled hands could be made to shoot. The result is a very handy gun for the dense woods and tight fields of the eastern US, yet accurate enough for 300 yard shots at predators and targets alike. It came out better than I'd hoped, but not without some hand wringing in the process.

Components 101

Being a do-it-yourselfer (sometimes referred to as a “cheap-skate”) I decided to build from stripped parts instead of using one of the AR kits. The latter consist of either complete upper or lower receiver groups. While affording great modularity with minimal effort, the kits are better suited to changing configuration on an existing AR. A key attribute of this rifle is that with the push of two takedown pins, receiver groups can be swapped, transforming a tactical carbine into a varmint hunter or mid-range competitor in less than a minute. I like to have a hand in parts selection and fitting so I decided early on to order everything separately. Of course, I also figured out that route is cheaper than buying a kit. Aside from the stripped lower receiver purchased from a local FFL dealer, all other components were purchased from parts companies like Del-Ton Inc. (DTI), Midway USA and Brownells. It's worth mentioning that all AR lower receivers have to come through an FFL since they're classified by BATF as the “firearm” and serial numbered accordingly. My only formal gunsmith training at that point was on bolt-action rifles and auto-loading pistols, so I dove into the internet and found enough info to get started. Using sites like AR15.com (<http://www.ar15.com>), I was able to find guides for building an AR. This website is a decent resource for novices, which

I definitely fit in with for this project. Like all blog-type affairs though, you have to understand you're reading opinions, so nothing is gospel. Still, I found the site's pages informative enough to keep me tracking in the right direction. An additional web resource is available for intrepid AR-builders, courtesy of Brownells. They now have video clips posted online from their instructional CD-Rom that talk you through the basics. I've not personally reviewed them but given the quality of Brownells other products and services, I'm confident it's well put together.

As with most accurate platforms, ARs need good quality, free-floated barrels and match-type triggers to have a chance at turning in tight groups. The latter component was the easiest choice; pointing me towards a company I became familiar with while still in the Army: Geissele Automatics (GA) of Jeffersonville, PA. Bill Geissele's triggers

were well covered in the Nov, 2008 PS article “*Geissele Automatics, the Trigger of the Future*” by Dan Arnold. Over the years I've been exposed to many good and bad triggers. It seems attaching “Match” as a suffix is all that's needed to make triggers sell, but a trigger's quality isn't in the naming scheme, it's in the flawless form, fit and function. I'll simply say GA's products are the finest 2-stage triggers available to AR aficionados. Bill's engineering and manufacturing expertise are backed by excellent quality control and rounded out with a background in competitive shooting. The end products are superb and I've put them in many ARs I've built, including replacing inferior or problem triggers from other manufacturers. These triggers are simple to install, adjust and hold their settings well and are well

Continued on next page



Typical performance of standard grade carbine barrels from Wilson Arms is in the 1 to 1-1/4 MOA range at 100 yds. After accurization most carbines shoot consistent 3/4 MOA groups. After all work was done, this Rifleman Consulting Eastern Predator shot regular .6 to .7 MOA groups with 55 gr. factory loads. Photo courtesy of Rifleman Consulting LLC.

Building Accurate ARs

Continued

worth every penny paid.

The other key ingredient—the barrel—initially gave me night terrors as I tried to decide which one to use. Like optics, the more I learn about barrels the harder it is to settle on one. I can't afford premium barrels for personal use, so I'm always stuck between budget and need. As luck would have it, while talking triggers with Mr. Geissele at SHOT '08, the General Manager of Wilson Arms happened by the booth. After playing "20 Questions" with Mr. Steven Pawl, I decided to take a chance on a Wilson barrel for the project. My only reluctance was that their barrels are only available with button rifling which I suspected would hamper downrange performance. After SHOT I ordered a medium contour, button rifled, 1:9, chrome-moly, 16" tube with a threaded or "post ban" muzzle. I planned an objective evaluation so I ordered from a wholesaler, avoiding any hand-picking. I chose a non-chrome lined chamber and bore, since my wife has no intention of fighting in the jungle or shooting hundreds of rounds



Some of the basic tools needed for AR assembly include (clockwise from L to R) a good torque wrench, barrel nut wrenches, non-marring hammers, punches and lower and upper receiver blocks. Photo courtesy of Rifleman Consulting LLC.

between cleanings. The barrel I received is of good quality for a lightweight carbine barrel, currently turning in consistent 3/4 MOA groups at 100 yds with factory fodder. I've built several rifles since this project using Wilson barrels, and found all- including chrome lined versions- to be in the same category. None of these are marketed as match barrels, so I'm very happy with that performance.

When I started this project, I was operating purely on theory. I was positive the gun would be safe to operate before presenting it to my wife, confident it would function and cautiously optimistic I could put the pieces in the right places well enough that my wife wouldn't suspect I was clueless. But I had no idea how well or poorly it would shoot. In the Army I'd either used mass-produced rifles and carbines with their mediocre accuracy or precision long-guns tweaked by very talented sniper-rifle 'smiths. So after the initial 10 round "Whew, it didn't blow-up" shoot, I went to the first range test with a blank sheet of paper. The break-in process hinted that this carbine would shoot in the "acceptable" category. After break-in, and prior to other accurization steps, the carbine shot consistent 1 MOA groups with several different factory loads at 100 yards. While not astounding performance on paper, I was happy to see it grouping and happier to be able to tell my wife her rifle worked. Being short on patience and long on inquisitiveness, it wasn't long before I began learning how to make ARs shoot better. Several carbines and heavy barreled match rifles later, I've learned this venerable platform is worthy of a second look for anyone dismissing it as inaccurate.

After learning some tricks and ensuring all my light carbines were shooting well (including tightening my wife's project gun down to 3/4 MOA) I endeavored to build a heavy barrel rifle with an eye towards accuracy. I figured if the first one didn't pan out I'd keep that little project to myself and stick with shorter range hunters and tactical guns. Since I already had luck with non-match barrels, I decided on a low cost gamble that wouldn't dent the wallet if it turned out to be a dog. I opted for a 20", 0.936" (OD), button rifled, chrome-moly barrel from Olympic Arms. As with all my barrels, this one had a 5.56 NATO chamber. I tried several factory "match" loads and had terrible performance, not surprisingly the worst were loaded for .223 Remington chambers. The best I could get were a few .9 to 1 MOA groups with Hornady 75 gr. AMAX factory ammo. On a hunch I tried the favorite load of all carbines I've built: Hornady 55 gr. V-MAX. I promptly hit mass-produced pay-dirt. This cartridge averages .51" in all [5 round] heavy barrel rifle groups I've shot, with the best to date being .261" at 100 yards. Overall, this mid-sized V-MAX has been a superbly

accurate projectile in all of my .224 bores. The addition of adjustable buttstock, pistol grip and the much needed free-float handguard rounded out the heavy rifle nicely.

Tool Time

Not surprisingly, a few select tools greatly aid basic AR assembly. A bench-mounted vice is a must, coupled with an upper receiver block used to it firmly while all manner of services are performed. The next item is a lower receiver block, which locks into the magazine well, stabilizing the lower so you can install the trigger, receiver extension (buffer tube) and all small parts. It's important to get the right size upper and lower receiver blocks for large (AR10) or small (AR15) platforms. Another AR-specific tool is a barrel nut wrench. I have several types and all have their pros and cons (hence owning several). The basic function is to remove or install a barrel nut but some combination versions also work on flash suppressors/muzzle brakes and free-float tube lock rings as well. A good torque wrench is helpful for certain parts of the gun. Just as with turn-bolt rifles, ARs benefit from proper torque on barrel nuts, muzzle brakes and optics mounts. I have several because I'm constantly switching barrels and parts but one good torque wrench would suffice for someone interested in building only a rifle or two. Lastly, a brass/polymer/rawhide hammer and good set of punches—roll pin, steel, brass and nylon—will make life easier. Having extra 1/16" punches will make life a lot easier. As I've gained more experience, I've bought or made additional specialized tools for different accoutrements and functions, but they're generally unnecessary for someone building just one gun.

Assembling an AR isn't particularly difficult, but an understanding

of the parts and how they function is important. I suggest researching direct impingement gas operation in general, and AR function in specific before beginning such a project. AR triggers range from fairly complex to dirt simple, depending on type and brand. Again, if you lack basic AR-smithing skills a web resource like AR15.com is invaluable. The folks that have taken time to photograph and detail all assembly steps deserve a pat on the back. It's important that applicable safety procedures are followed during and after AR assembly/accurization, just as with any firearm. If in doubt about things like barrel nut torque and bolt/barrel headspace measurements, let a professional do it for you.

Group Therapy

The best time to accurize an AR is while building it, but going back and tweaking an existing rifle or carbine isn't that difficult. Here again, having a few specialized tools makes the job easier. The two tools I use most often are a receiver lapping tool and muzzle crowning/re-crowning tool set. The lapping tool allows you to "true" the front face of the upper receiver, seating the barrel extension squarely and theoretically aligning the bore with the upper receiver. In this case I've found that theory follows practice. I have yet to encounter an AR that hasn't tightened up noticeably after truing the receiver. In a couple cases this procedure changed 2 MOA plinkers into 3/4 MOA shooters. That's quite dramatic and makes me wonder where the poor tolerances exist: upper receivers, barrel extensions, barrels or some combination. Care is required to prevent damaging the receiver, as the lapping tool must be well lubricated to prevent "burning" of the inside surfaces of the upper receiver. Commercially available lapping tools have a relief

groove to prevent lapping compound from getting inside the upper receiver and removing metal from the wrong places.

Re-crowning the muzzle is a procedure I don't do automatically. If I see a damaged or faulty factory crown I'll clean it up, usually using an 11 degree cutter. If I have a rifle or carbine that isn't living up to its potential and I haven't touched the crown, I re-crown it and that normally provides an improvement. I say "normally" because a perfect crown won't fix a dog of a barrel, but it can help a situation where the crown is contributing to inaccuracy. Although it's a relatively simple procedure, I leave crowns of acceptable or above average performance guns alone.

End Game

As I write this, winter's gray clouds are surpassed by the much darker prospects of life for gun-enthusiasts under the "change" government headed our way. I suspect by the time this article reaches print we'll have seen the first shots across the bow of our Constitutionally-guaranteed and Supreme Court-affirmed rights to firearms ownership and possession. Perhaps no branch of the gun tree will be more savagely pruned than that of semi-automatic center-fire rifles and carbines. Wrongly categorized as "Assault Weapons", these firearms have moved firmly into mainstream shooting. With nearly all AR manufacturers and custom shops offering versions suitable for target, competition, home defense and multi-game hunting, it's clear to any honest shooter that the platform lends itself well to various pursuits. The timing is ironic here: Just when the industry is embracing the AR as another useful tool

Continued on next page

Building Accurate ARs

Continued

versus a mere weapon of war, the voting majority of Americans has set the stage for legislating these very capable arms right out of legal ownership. Of course I had no idea we'd be headed in this direction when I picked the AR platform to specialize in after retiring from service. Sour grapes? Yup. Poor timing? Double Yup. Worried about the future of American freedom? Off the Richter scale on that one.

If I've learned anything since starting down this road, it's that selecting proper components, applying attention to detail in fitting /assembling and careful accurizing can yield very good shooting,

semi-automatic rifles. I'm not sure what limit exists on AR accuracy, but I have several roads to travel in pursuit of the best practical accuracy I can achieve (i.e. without converting to single-shot, etc). I plan to dig deeper into hand-loading and building a .308 Win AR, assuming parts will ever become available. I've also got a set of unused bore-laps currently giving me the same look I get from my Lab when he's tired of waiting. The fact that I'm already able to achieve 1/2 MOA or better without bedding blocks, ACRA-GLAS® or stocks replacement shows me just how versatile this shooting platform really is, and just how well-suited it is for sporting uses. I can only hope that the folks in Washington DC are honest enough to recognize

that. I won't hold my breath waiting for such candor though....

Steve Adelmann is a former SOF sniper with 21 years and 10 combat tours of duty in the US Army. He owns Rifleman Consulting, helping freedom-loving US citizens through writing, advising and AR-style rifle customization services.

Go to:

<http://www.riflemanconsulting.com> for more information.

Sources

Del-Ton, Inc.

910-645-2244

<http://www.del-ton.com>

Midway USA, Inc.

800-243-3220

<http://www.midwayusa.com>

Brownells, Inc.

800-741-0015

<http://www.brownells.com>

Geissele Automatics

610-272-2060

<http://www.geissele.com/>

Wilson Arms

203-488-7297

<http://www.wilsonarms.com>

Olympic Arms, Inc.

800-228-3471

<http://www.olyarms.com>



The tool list for accuracy work can be extensive but the basics include a receiver lapping tool, lapping compound and receiver block as well as tools to clean up or repair a muzzle's crown. Photo courtesy of Rifleman Consulting LLC.

