

## Introduction

If there was ever a time where I purchased a rifle that wouldn't shoot accurately this was the case. The AIA M10A1 rifle came onto the UK market around 2006 and I was eager to purchase one because I liked Lee Enfield's, liked something different and this was an opportunity to purchase a new rifle in a different calibre and at a moderate price.

Personally I was interested in the carbine version with a 7.62x39mm 20" barrel, which is the top rifle in the picture below. The rifle looked good with nice woodwork and I thought it would be fun to shoot. Having paid some £550.00 I was unaware that I had just purchased a rifle that had a number of inherent design faults, would misfeed and be unable to shoot accurately.

It was a shame really as I really did like the look of this little rifle, but at 100 yds I was struggling to better an 8" group and that was not acceptable. After an unsuccessful and unpleasant attempt to put matters right with Sabre Defence the UK importer, I took a step back and decided what to do next. I do not like to give up on rifles and this article is about the long and rather twisty route to returning this design into a good, reasonably accurate rifle.

## Brief History

This rifle was imported into the UK by Sabre Defence and then distributed via a number of dealers. The rifle was clearly designed in Australia but if the comments on the Internet are to be believed the rifle was manufactured in Vietnam or certainly parts of it were. There



are three versions but only two were imported into the UK that I am aware of. Working from top to bottom:

1. 7.62x39mm Carbine with 20" barrel. UK import
2. Very similar rifle to the first but with a 16" barrel, Monte Carlo butt and fluted fore end.
3. This rifle had a very similar appearance to the Lee Enfield No4 and was in .308 calibre. UK import

Whilst I believe many minor components are from the British Enfield No4 rifle, there are clearly some major differences. These are but not limit too:

The receiver; barrel; trigger guard; bolt Head; magazine housing/Feed ramp; magazine; magazine catch assembly; handguard assembly; scope rail; foresight assembly and flash eliminator.

It is not my intention to describe the rifle itself, for that information you can visit the following sites. I have listed three sites with various views and not all are negative, so you can decide for yourself.

<http://www.australianinternationalarms.com.au/>

<http://www.303british.com/id41.html>

[http://www.chuckhawks.com/aia\\_rifle.htm](http://www.chuckhawks.com/aia_rifle.htm)

## Accuracy

Using both factory and reloaded ammunition I could not get a smaller group than 5-9" at 60 yards using a bench and rest. Even with the 7.62x39 cartridge I was expecting a better group than that. I approached sabre defence and got completely rejected and as a result I decided to do some of my own research.

1. Cartridge overall length for this cartridge is 2.200" (55.90mm). When I measured the lead it was 2.435" (61.85mm) that's a difference of 0.23" or 6mm. That's a major jump for a short bullet which meant it stood little chance of being aligned with the bore.
2. The 7.62mm bullet is .311 in diameter. I slugged the bore, the lands were .309 and the grooves were .313.
3. I also had the barrel set up on a lathe and ran it to see if it was true. It was considerably out.

Lastly and whilst I have no proof I was also suspicious of the flash eliminator as I felt that it disturbed the gases in an unbalanced manor when they exited the barrel.

## Magazine

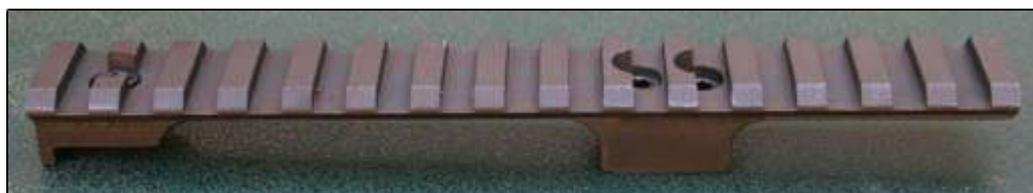
The magazine of these rifles are substantial and solid in there construction and originated from the AK47 type rifles. When I mean solid you could open coke bottles with the lips of these magazines and not damage them. However the magazine spring is very strong and if you feed the round slowly out of the magazine it had a tendency to jump loose and will misfeed.

## Magazine Catch

When you insert the magazine you must place the lug at the front of the magazine in first so it engages in the corresponding recess in magazine housing and then pull the magazine back so it locks into the magazine release catch. Miss this recess and I had a hell of a job to remove the magazine. In one case it was so bad that I had to strip down the rifle to remove the magazine. One other snippet of information was getting your skin caught between the magazine and the trigger guard, it does happen and it did hurt.

## Scope Base

Whilst this is a vast improvement on the old Enfield, the base is positioned to far forward. As a result unless you have high or extra high rings, the scope cannot be positioned sufficiently to the rear to give you the correct eye relief. Both bell housings have the potential to clash with the base if not mounted high enough and this increases the height of your cheek and thus poor positioning for each shot.



## Magazine Housing/Feed Ramp

With the rifle in the horizontal, the bolt would feed a round out of the magazine and then the edge of the cartridge would catch on the edge of the chamber causing the round to jam. You could apply more force and ram the round into the chamber but it was less than perfect and damaged the brass. So I had purchased a rifle, spent a reasonable sum of money to purchase it, spent more trying to understand why this rifle didn't shoot accurately and the dealers/importers didn't want to know – GREAT.

## Going down a different path

For a while the rifle sat in my Armoury and I moved on with different projects. One of those projects was designing sub-sonic rifle ammunition. The cartridge I decided to use the 7.62x39mm with an 185gr bullet and sitting in the rack of my armoury was the M10A1, an ideal donor rifle.

I decided to redesign the rifle as a hybrid, utilising a ported barrel a tradition style screw-on moderator. This increased the rifles overall length but reduced the moderators diameter, allowing me to retain more of the rifles original hand guard. It also kept the design more simple. The ported barrel was encapsulated by a simple sleeve; this was secured by the screw-on moderator using the original muzzle brake barrel thread.

The pictures on the right show the first completed prototype with the lower right picture showing the rifle's moderator stripped down for cleaning. The initial screw-on moderator design was fairly basic, with efficiency not so much in mind but the correct bore diameter, safety and the effectiveness of the overall design being of a higher priority.

## Performance

The prototype moderated M10A1 achieved its design targets with no failures and an enhanced performance against a .45ACP DeLisle which I used as a benchmark, effective range was doubled to 200yds with accuracy similar to the DeLisle but with the poor barrel of the M10A1, I believe this can be improved upon substantially with a superior barrel/rifle.

Attenuation was very good with the following result measured at the shooters ear; 104.8dB(A) however I wanted to improve the ammunitions accuracy so a started to utilise a CZ 527 in 7.62x39 and the AIA M10A1 went back to the Armoury. Having altered the rifle for the sub sonic ammo project, I was somewhat at a loss as to what to do with the rifle next. I couldn't and wouldn't sell it because of its poor accuracy, so the rifle sat in my Armoury for next two years until I had the funds to rebuild it with a superior barrel.

## New specification 2011

2007 I first purchased this rifle and in September 2011 it was coming out of my Armoury for its last transformation. My plan for the rebuilt rifle was to enter it into my clubs 100 -300 yrd ETR shoots. To get this rifle back on the road and with a reasonable level of reliability and accuracy I wanted to address the following areas:

## Barrel

Whilst this rifle had a lot of faults the primary problem was the very poor barrel and therefore it had to be replaced. I wanted to maintain the original carbine appearance, so the barrel specification was to be as following:

1. Barrel profile: heavy as I could get it tapering to 0.7" just beyond the hand guard and then parallel to the muzzle.
2. Barrel length: 20" in keeping with the original.
3. Bore: .308
4. Lead: 0.015"
5. Muzzle crown: 11°
6. Muzzle thread: 9/16 x 24 UNEF for a moderator and or muzzle brake



You may have noted that I spec'd a .308 bore. Traditionally the 7.62x39mm is .311 but this limits the availability of bullets dramatically. With most reloading dies you can get both the .311 and the .308 expander. Using a .308 bullet improved the ballistic coefficient slightly, gives me a much greater choice of bullets and also allowed me to use the Lapau .308 sub sonic bullet, but more about that later.

## Feed Ramp

I am hoping that the feed ramp is not the problem. The chamber of the original barrel had sharp 90° edge, when I had the new barrel fitted I was going to place a small chamfer so therefore avoid the sharp edge of the case engaging the edge of the chamber.

## Woodwork

As I had chopped up the original stock to fit the moderator I needed to source a replacement stock and surprise, surprise there was no spares imported into the country with these rifles by Sabre defence. My only option was to modify an existing Enfield stock. The receiver and the trigger guard were a different shape to the old No4's but I reckoned I could adapt a Lee Enfield No4 Mk2 fore end to fit. As you can see in the picture below there were certain key similarities, the main body screw and the long screw that passes through the stock as the rear being the most important. There was plenty of spare meat on the No4 Mk2 stock and being beech it was a stronger than the Malaysian wood of the original.

## Magazine Upgrade

This was a simple upgrade as the original magazine having removed a coil or two of the spring performed well enough. The old AK magazines whilst tough were heavy and a more modern plastic design would offer a simple but effective upgrade by reducing the weight of the rifle when fully bombed up.

## Trigger

The trigger mechanism on these rifles is identical to the No4 Mk2 and so an easy upgrade was to purchase an aftermarket trigger. These are available from Huber in the USA and drop straight in. However in the UK these triggers are retailing for near enough £100.00, so to minimise the cost I intend to tune the original trigger.

One word of caution, whenever adjusting a trigger please ensure that the trigger is adjusted in accordance with the manufacturer's instructions, failure to do so will make the rifle unsafe. If you are not sure, employ the services of a reputable armorer or gunsmith.

## Receiver

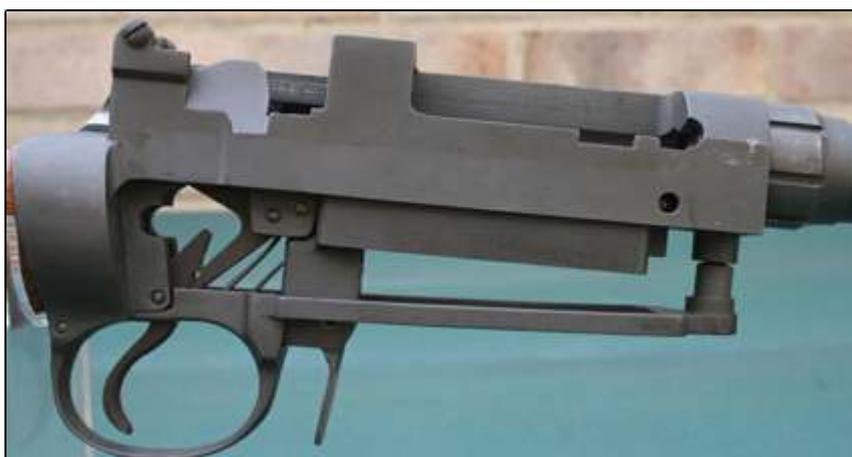
Whilst I criticise the barrel quality the overall design is very clever.

The slab sided design is easier to manufacture and undoubtedly stronger than the original .303 rifle. The magazine housing which you can see in the magazine well is removable and different housings accommodate different magazines and hence different calibres.

Whilst the barrel screws into the receiver the nut locks it in place and therefore changing barrels is easier than a more traditional design.

I am only aware of two calibres for this rifle, 7.62x39 and 7.62x51 but production and assembly would have definitely been easier with this design.

As shown on the top picture on the following page the magazine recess in the trigger guard is overly large especially for the AK magazine. This is because it can accommodate both calibres. It does not however





Support either magazine as this is done by the magazine housing.

### Building the Rifle

The barrel work was done by Neil McKillop at McKillop Engineering Ltd, near Reading. It took a long time to get the reamers and gauges as this is not a typical calibre for re-barrelling. The barrel was also different, although the bore was a standard .308, twist for this calibre was 1 in 7½ against the .308 Winchester being 1 in 12 so this was quite a mission for a UK gunsmith and I had to be patient.

I had high hopes for this rifle, my primary requirement was to get this rifle back on the road firing full powered 7.62x39mm with .308 bullets, reliably feed and to have a reasonable standard of accuracy; 50mm group or less at 100 yards would be good. However I also had a secondary goal with this rifle, fitting it with a moderator and firing sub sonic ammunition.

### Moderator & Sub-sonic Ammunition

I spent a long time at considerable expense experimenting with sub-sonic ammunition (see article "Moderator Technology") whilst I produced efficient and reflectively accurate rounds I was limited by the bore size being .311 and 185gr bullets, top right hand picture. By fitting a .308 bore I could utilise the purposely designed Lapua 200gr sub sonic bullet as shown to the bottom left hand picture. I decided to fit a Reflex .308 T8 moderator, it was second hand but I felt it would be ideally suitable for both full powered and sub-sonic rounds.

### New Barrel

The new barrel finally arrived but I was to be disappointed as it was a 1 in 14 twist, fine for for normal .308 rounds but far to slow a twist for subsonic work. I had waited a long time for this barrel and I was now in a catch 22 position.



I decided to go ahead as I had waited long enough, it meant that my subsonic's weren't going to work but as a 7.62x39 it would be fine.



The previous picture above shows the new barrel, same length but a slightly larger diameter across its full length where the original barrel was tapered with the muzzle being crowned and threaded.

One of the inherent design problems with the early M10 was its ability to feed reliably. The magazine was fine but the round was fouling as it entered the chamber. On this barrel a small chamfer was applied at the face of the chamber and test cycling with dummy rounds seemed to confirm that the matter had been resolved.

## New stock

As I had altered the original stock to accommodate the moderator modifications it was no longer suitable for this rebuild. There were no spares to be had so the best option would be the wood of a No4 Mk2.



To make the stock fit you have to machine out the wood to accept the M10's receiver, the finger grooves have to be machined as these are absent on the No4 and the stock cut to length. I actually cut mine slightly shorter as I was fitting a telescopic T8 Moderator but there was only a inch difference.

I was planning to fit the upper handguard as I had retained this from the original setup but this is where I walked into a problem. I hadn't noticed that the original front band is from the SMLE and as a result is smaller and will not fit a No4 stock. Therefore I replaced the front band with a bigger No4 band and cut a recess in the No4 stock to accommodate it.

I re-profiled the No4 stock to match the upper handguard and its shortened fore end. Originally I hadn't planned to bed this rifle as I felt there was little to be gained accuracy wise. However I decided to bed the rifle, not to increase the accuracy but to add more strength and rigidity to the receiver/stock combination by improving the wood's fit.

The upper handguard fits over the barrel using spring clips similar to the SMLE and secures using the front band previously mentioned. As the stock was beech it was stained to match the remaining wood and as can be seen from the photo on the following page came up rather well.

## Attachments

My intended use for this rifle was practical shooting and secondly shooting for just plain fun, whilst this is an En-field rifle, it is a modern clone therefore I intended to fit some modern attachments.

My first choice was to add a picatinny rail as I wanted to add a MAKO T-Pod. The picatinny rail was by ERGO and was made from plastic. This suited me as I needed to cut and trim it to fit the stock. As I was only fitting a bipod/grip precision was not a criteria and therefore its plastic construction was acceptable. The T-Pod fits to the Picatinny rail and is a rather clever combination of a fore end grip with a built in bipod.





I had also considered fitting an after market Tapco AK47 magazine. However at the time of writing the rifle would not accept this type magazine and after numerous attempts to make it fit I gave up and disposed of it.

The original rifle had a flash eliminator with a foresight which screwed into place and was secured by tightening a screw. This was a poor design as there was no way to ensure the foresight was truly vertical except by guesswork. The old eliminator would not fit the new barrel so therefore I decided to design a new one and improve on the original design.

The new design was a muzzle break as depicted on the lower left and has a dovetail platform to accept the original foresight block and an internal shoulder to ensure the foresight is always vertical. It is secured to the barrel with a grub screw and the whole unit can simply be unscrewed and replaced with the T8 Moderator.



The muzzle break gas ports are designed to accommodate a number of factors: they will accept a .22 P/B brush for cleaning, they are angled slightly forward to dispel gas and noise away from fellow shooters and there are no ports a 6 o'clock to avoid disturbing debris on the ground when firing prone.

Results from the new muzzle break will be forthcoming when I test the rifle.

### Scope

Due to the poor design of the scope base and the fact my engagement ranges would not exceed 300yds my choice of scope was to be the Leupold 1.5-5x20. The absence of the object lens bell housing avoided any problems with eye relief and the x5 magnification would give me sufficient power for the fast snap type shooting required for the ETR competitions.

### Ammunition

Just a reminder to the reader, this rifle does not accept standard 7.62x39 rounds as the bore size is .308 bore against the original barrels .311 bore.

As a result reloading is the only option for this rifle. Whilst I am using the standard M43 cartridge case, I use a smaller expander ball to neck the case down to .308. RCBS die sets supply both expander balls but I also believe Hornady supplies a similar die set. I chose the Berger 135gr match bullet because of the slow twist of the rifling, however I may change this to 125gr depending on my reloading experiments as the the bullet seating and its relationship with fitting the rounds in the magazine leaving very little room for manoeuvre.

Powder wise I chose Vihtavouri N120 as it is ideal for this cartridge but there is a wide range of powder weights depending on what manuals you study. American manuals are always underpowered, with max loadings at 22grs, Viht manuals suggest 23.5grs and my Quickload reloading program corresponds with the Viht manual.



## Finished Rifle

The pictures below show the finished product in its various configurations. I removed the original battle sight as quite frankly this was useless but it left a ugly cosmetic gap in the receivers layout so therefore I fitted a modified Mk 2 rearsight from a Lee Enfield No4. I have no plans to use the rearsight but if you removed the scope rail it would be viable. With hindsight, If I redesigned the muzzle break and increased the height of the fore sight dovetail you could use the iron sights without removing the rail.

Fitting the No4 stock had added unplanned sustenance and strength to the fore end which is an added bonus as I had not identified the original stocks smaller dimensions. I had accidentally solved the original rifles feed problems by adding a small chamfer to the chamber face when originally I thought the feed ramp and its angle was at fault.



## Range Test

The first range test was to function the rifle and identify the most suitable load. As the rifle had a slower barrel twist than the standard 7.62x39mm round I increased the bullet weight from 123gr to a 135gr target hollowpoint. As the muzzle brake was my design and untested, I chronograph the load without the brake fitted. Best load was 23grs of N120, generating an average velocity of 2229fps. Feed and extraction was without fault.

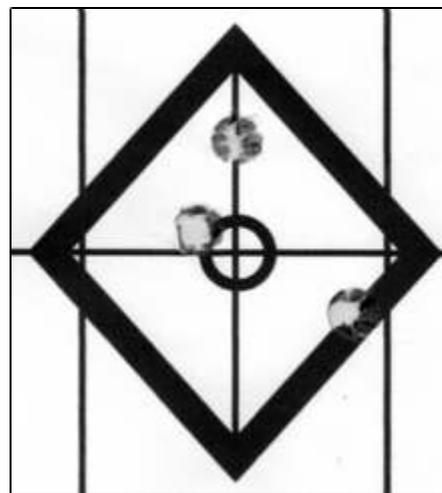
The next outing to the range was for zeroing purposes and to test the muzzle brake. The ports on the brake are angle slightly forward to take the sound and the concussion away from fellow shooters. Muzzle jump was noticeably reduced although in the field I was unable to physically measure it. Grouping was 30mm at 100yds as shown on the target to the right and compared with the original barrel which could not get better than 8" group at 100yds I would say that is a marked improvement.

## Summary

Whilst this is a new rifle the designer definitely incorporated aspects of both the No4 & No1 MkIII\* rifles. Predominantly this rifle is a clone of the No4 Mk1\* but the front band and the fore end are from the SMLE. The original website for the M10 stated that the rifle was made from all original parts. The question must be asked did the designer incorporate the best of the two designs or did he design the rifle with spare parts availability in mind. Tooling is expensive for new parts so it would have much cheaper to manufacture a new receiver and barrel combination but where available, use original Enfield parts.

I didn't achieve all my original aims, because of the slow twist rate I wasn't able to incorporate the use of sub sonic ammunition, however the use of the T8 offset that somewhat.

The original barrel was very poor and in my opinion definitely let the rifle down, whether this was the downfall of the rifle in the market place I cannot say but they are definitely not importing this rifle into the UK any longer. With my improvements the rifle has a second lease of life, it shoots well, fun to shoot and if I may so, looks good as well.



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First published: 12 August 2011  
Updated: 04 Feb 2012