Introduction

The primary business of Thames Valley Guns (TVG) is the professional renovation of classic military rifles from the turn of the century to the mid-1970s. I am regularly asked to upgrade these rifles to more modern specifications; however converting a Lee Enfield No4 to a No4T is a rather rare event, which is due to the rather large outlay and effort, required.

I am a REME (Royal Electrical & Mechanical Engineers) Armourer who trained on No62 Armourer Course at Bordon, Hampshire, England in 1979. It was during this course that I was trained on the L42A1, during my 12yr career in the British Army I spent most of my time with Infantry battalions and in particular working with L42A1's on Sniper concentrations. It was this work that developed my passion for Sniper rifles and I have been working with them ever since.

The next few pages describes of how Thames Valley Guns successfully and professionally converts a No4 into a No4T and describes how's you the buyer can avoid any potential pitfalls.

Fraudulent Copies

No4T's fetch a good price these days (2010) typically £3500 - £4000 and that is simply due to their increasing rarity. As a result, unscrupulous dealers will attempt to sell rifles made up from parts as a genuine No4T and as course at a genuine rifle's price. The only way to avoid this is to stick to known trustworthy dealer and to do your homework.

There are plenty of good publications out there and some decent information on the internet, however the books I would recommend are as follows:

1. Lee Enfield No4 and No5 Rifles by Charles R Stratton
2. An Armourers perspective .303 No4T Sniper Rifle by Peter Laidler and Ian Skinnerton
3. The Lee Enfield Story by Ian Skinnerton

At TVG we build up a No4 that is a copy of the No4T, it may have a genuine No32 scope and No4T parts but it is not an original. We do however build the rifle with the intention of having the same or similar performance as the original.

Reasons to convert a No4 to a No4T

Only two reasons that I am aware off; to own a No4T and at an affordable price, but even then do not expect much change out of £2500.00. Also expect the project to take some time as you will have to source all the various parts prior to pre-test, the build itself and the final accuracy tests.

Sourcing and purchasing the parts

Rifle

As a Armourer and as a person who constantly restores No4's I know there are certain No4's that function and shoot better than the standard rifle, they just feel right, this is a difficult thing to describe as it is a

matter of experience but suffice to say, their woodwork looks more appeasing, they assemble with greater ease, they cycle more efficiently and most importantly they shoot a tighter group.

You must test fire the rifle to ensure it is capable of a tight group and this is easier said than done as most dealers do not have ready access to a range. Secondly it is time consuming and requires a small supply of ammunition, all of which will cost you.

The rifle should also meet the following gauging requirements. If your dealer is a knowledgeable gunsmith or Armourer he is likely to have the following gauges:

1. Cartridge head space gauges: 0.64in & 0.74in
2. Firing pin protrusion gauge: 0.40in – 0.50in
3. Bore gauge: 0.301in
4. Bore gauge: 0.307in Muzzle
5. Bore gauge: 0.308in Lead

Should the rifle fail any of the above, it should be rejected. One other criterion I would require is a No4 which has been blued rather than painted finish, which I explain the reasons for later.

This is how I personally would select a donor rifle; however the customer might want to included other criteria into this equation, for example;

1. In line with the original selection process. This would include the foresight blade secured with a screw and a medium sized butt.
2. By manufacturer, Maltby, Enfield, Longbranch and BSA Shirley.
3. The customer could try and source an original No4T rifle without a scope but I doubt very much whether this is feasible as they have all been snapped up.

At the end of the day all this selection criteria, adds time, cost and in my opinion is not worth it. If you are planning to spend £2500 you need to ensure that the rifle will regularly achieve a good 3" or less group at 100yrds, have a good quality unworn barrel, receiver and bolt, the rest is irrelevant as it can be easily restored.

Once you have identified your rifle, you then need to have the rifle inspected to ensure the rifle has been assembled and is functioning correctly and what work is needed to the basic rifle to get it up to standard.

Woodwork

The only other item of woodwork you will require to purchase is the cheek rest. They were manufactured for both the No4T and the L42 and you will find both in the market place together with some more modern replicas. The ones that are advertised as original should be looked at closely as the seller will definitely have raised the price, in my opinion most of them will be for the L42's, this is OK because as far as I know the design was identical. In my experience I have only seen original cheek rest's manufactured in Beech; however that does not mean they were not made in walnut.

There are modern replicas in circulation and as long as they match the original they should be considered, they tend to be in walnut and they require a lot more work to fit.

You can also purchase replica cheek rests from the US but the ones I have encountered are considerably different in shape, so I would stay away unless you can confirm their authenticity.

Suppliers are Ebay, Gunparts Corp and various British dealers.

Cheek rest screws

I have added this paragraph because unfortunately there are unscrupulous dealers out their selling so called genuine screws. One of my customers purchased these screws in good faith only for me to point out they were modern cheap plated Philip screws. The originals were brass slotted wood screws, if you can't find a supply go to B&Q's and buy some good quality brass slotted wood screws of the correct length, I can assure you, there is very little difference.

No32 Scope

These are rare beasties and you will pay a lot of money for one. I see one from time to time on Ebay otherwise you will have to search the internet until one comes up with a dealer or private sale. In the UK I occasionally see one from time to time at the Bisley Phoenix Trade show.

I am not an expert on these scopes so the following comments are confined to my limited knowledge as an Armourer. My first comment is to do some serious homework, read up as much as you can. If you have any contact with Peter Laidler, have a talk as he is in my opinion the foremost expert on these scopes. There is also a web forum called Milsurp.com (http://www.milsurps.com/) which contains some useful information. Do not go into the purchase of one of these scopes blind as it could cost you dearly.

If you find a scope the first thing is to verify the dealer, if he's genuine your half way there, if it's Ebay or a dealer with a poor history, approach with extreme caution.

As an Armourer, my brief inspection criteria for the scope would be as follows:

1. When you handle the scope, does anything appear loose.
2. The external surfaces should be reasonable with no obvious dents, fractures, burrs or distortions
3. Look at both lenses in the light, this is difficult to explain but look at the lens from an angle, look for scratches, fogging, chipping or obvious fractures.
4. Look through the ocular lens, the one nearest your eye, it should be bright and clear with no obvious damage.
5. Look through the sight at an object 100yrds or more away, the picture should be clear and in focus.
6. Look at the reticle, again no damage, no distortion, breaks or dust.
7. Look at the windage and elevation drums, they should be sitting square to the body.
8. Gently adjust the drums, they should rotate positively, should not slip, or feel rough or erratic.
9. Look at the objective lens, like the ocular lens it must be free from damage.
10. Look through the objective lens and mean through the lens, look behind it for any signs of damage, fungus, growth or anything that may be loose.
11. Look at the scopes markings, this is where your research will pay off; do they appear genuine, serial numbers, correct font and MOD markings.

I make no promises that the above will offer you any guarantees, I am simply offering you my experience in the hope you can obtain a reasonable scope.

Body Pads

I am only aware of replicas and the one's I have experienced were of the wrong thickness. This causes problems because if they are too thin you will have to shim to get the scope in line with the bore. If the person assembling the rifle lacks the engineering skills the scope will never align correctly and your very expensive project will be over.

Original pads taken of an unserviceable rifle will be heavily staked and would have been fitted/machined for the original rifle. Generally I personally would avoid second hand pads.

Telescope Bracket

The bracket on this rifle was a replica. Whilst it presented no problems, it should be clocked to ensure the bearing faces are true and that when the bracket is secured to the pads, it is completely vertical. It should also be fitted carefully to the scope to ensure the scope and the bracket mat correctly. If the bracket is poorly made there is every possibility it could damage the scope.

Sling swivel

Two issues to be aware off. With the No4T the main screw which secures the receiver to the woodwork was fitted with a sling swivel for use with the M1907 sling. There two sling swivels in circulation that look almost identical, the No4T and the P14. The P14 has a different thread which will damage the rifle if you try to force it.

The rear sling swivel was also modified to take the 1907 sling and can easily be identified by its much larger size.

Rearsight

The No4T rearsight is different to that of the standard No4. The battle sight is removed and a section of the sight is machined to provide clearance and allow the bolt to be removed without lifting the rearsight as was required for the No4.

Unfortunately unscrupulous dealers are selling sights with only the battle sight filed off - Buyers beware.

Chest and ancillaries

It is not my intention to go into the transport chest and any of the ancillaries in this article as we are only discussing the conversion of the rifle.

Assembly of the rifle

Before I start to expand on this subject I think a few word of explanation are necessary. Most publications I have seen in circulation and on the internet, discuss the assembly of the scope to the rifle by the original methods used by Holland & Holland and as a source of information are excellent references.

However this is 2010 and those facilities, tooling and techniques are long gone, I do not have unlimited spare parts, I have one set purchased at considerable expense by the customer, who may have taken months or years assembling the relevant parts, so therefore I cannot afford to make a mistake. If I do make a mistake I want to be able to put it right otherwise I will have to reimburse the customer. Therefore I assemble these rifles using modern engineering standards as I will explain as we go along.

Preparation and tooling

A note of warning; this is not a job for a amateur or super keen shooter who has read a few books and can quote from memory all of the MOD part numbers for a Lee Enfield rifle. You will need a well equipment engineering workshop with a lathe, milling machines, highest quality tooling and measuring equipment. Lastly and most importantly you need a tool maker/Armourer who knows not just rifles inside out but has considerable experience working on the L42A1 or the No4T.

Preparation

The rifle needs to be completely dis-assembled right down to the basic receiver and barrel. This is a good opportunity to degrease both the rifles action and all the parts. This process is very revealing and you will be surprised as to the amount of debris, rust and dirt that is hidden underneath the oil and grease. Whilst I complete this process with all my rifles as a matter of pride and professionalism it is also for a very good reason. Your rifle is about to be machined to tolerances of plus or minus one thousand of an inch. Any rust, debris or dirt is simply not acceptable. Once the rifle has been de-greased I then polish both the rifle and all the component parts to remove any debris or rust that the degreasing process has identified.

The rifle is now ready to be mounted on the milling machine's bed. This process is critical to the whole exercise. The rifle must be secured to the bed and must be perfectly setup in three axis's, vertical, horizontal and rotational. The rifle's bore must be absolutely parallel to the bed and the receiver utilising the rearsight bracket must be vertical to the bed. I stress the rifles bore as no external surfaces should be used. The bore is where all measurements must be taken from.

Tooling
Two tools need to be manufactured for this task.

1. Cylindrical bar which has the identical diameter to the No32 Scope and tapered to a point at both ends. This replaces the No32 scope in the scope bracket.
2. Cylindrical bar machined to the same dimensions as the rifles chamber and bore. Once inserted in the bore and chamber there must be no movement.

The purpose of the two bars is to act as point of reference to ensure exact alignment of the scope bracket with the rifles bore.

Assembly of the pads
I have no intention of describing the engineering process here as this is not the purpose of the article.

However there are some points you should be aware of. The original pads were fitted and then machined in situ to achieve alignment with the bore. We cannot do this with replica pads as they have already been machined, therefore the pads have to aligned with a micrometre or clock. The side of the rifles receiver has to be milled to ensure vertical alignment with the bore. The front pad is to be fitted first and the rear pad second. The rear pad again has to be not only aligned with the bore but also the front pad. The rear pad also has to be profiled to rifles receiver.

It is at this point that you will identify if the replica pads you have purchased at some considerable expense were machined to the right dimensions. In my case and I suspect in many others they are not. The pads I was provided with were to thin, therefore you can never align them with the bore. The only solution is to shim and pack them out. If the pads are too thick this is not such a problem as they can by machined to size.

Another minor issue is the hardness of the receiver; this varies depending on hardening process of each manufacturer. Whilst the metal at the front of the receiver was relatively soft the rear was so hard, even a tungsten carbide tool struggled to get through.

Once the pads and the scope bracket are perfectly aligned with the bore, the pads and the receiver require a protective finish and the pads have to be secured.

Protective finish
Many No4's have a baked paint finish, I am not sure if this finish was applied to No4T's, it was however applied to L42A1's. The problem with this finish is that it cannot be replicated today. There is a very good modern paint process for firearms called "Duracoat" and potentially you could utilise this process, however it is not my primary choice as any paint will produce an uneven surface and will affect the fitting of the pads. Secondly if you paint after the pads are fitted, moisture can gain access behind the pad and rust and again cause an uneven surface. If your No4 has this finish I would suggest you have the receiver powder blasted before the machining process takes place and the fitting of the pads.

Fortunately the No4's I have experienced had blued receivers which are my preferred choice of protective finish. The reason is that you can blue the pads, screws, shims and receiver with no effect on the pads.

Securing the pads
On the original rifles the screws were secured to the pads by staking. Whilst this process worked in the 1940's it ultimately destroyed the pads. I remember seeing as a young Armourer pads that more had more stakes than the moon had craters. It looks terrible and ultimately the pads surface becomes so damaged you can no longer effectively lock the screw.

I use Loctite, it looks better, it is just as effective and if the screw becomes loose it can be cleaned up and re secured, lastly the pad is not damaged in any way. So far I am using Loctite 243 with no problems, however if the pads do become lose you can increase the adhesive strength up to Loctite studlock. However if you use studlock the only way you can release the screws is by applying heat.

Collimation
I read an article on the internet by Peter Laidler that the rifle and scope were collimated, if I remember correctly at 175yrds. Once again the facilities are no longer available and I certainly have no access to such facilities, so I will be quite honest and state that when I fit a scope it is parallel to the bore, give or take a thou, so adjustment must be done on the scope.

Remaining works

Woodwork restoration
Most No4's purchased "off the shelve" are in various conditions and usually the wood work has seen a rough

life. Therefore if you are going to invest in a conversion of this type get the woodwork restored. A good walnut stock, fully restored will really add to the rifles appearance and will add to the overall professionalism of the job.

The cheek rest should be colour matched to the butt and correctly fitted, ensuring that it is secured, vertical, contoured to the butt and does not interfere with the removal of the bolt. The slotted brass screws should not protrude into recess for the oil bottle.

Bedding
The wood on a No4T/L42A1 has to be correctly fitted and the two rifles differ slightly in this respect. The L42A1 has a heavy barrel and has to be "Floating"; the No4T has a light barrel and does not float, in fact it must bear against the fore end with a force of approximately 3lbs.

To bed an Enfield by traditional methods requires skill, patience, time, engineers blue and a sharp chisel. In short the receiver and barrel must bear against certain key points to maximise the rifles accuracy. Get it wrong and the rifles ability to generate a tight group goes out of the window.

Whilst the above process is fine, it can be very time consuming and thus expensive. To minimise the cost I use modern bedding materials which is a vast improvement on the old methods. Using a modern two pack epoxy resin achieves a perfect fit between the receiver and the wood.

Before the purist start to scream blue murder, I was taught to do it the hard way but I remember quite clearly that once I was in the field with an Armourers workshop we were issued with a two pack putty that was for the very purpose of bedding.

Trigger

I have left this section deliberately till after the bedding section for the simple reason that on a No4 Mk1, the fitting of the woodwork **will** affect your trigger pull. Therefore it is imperative that the wood is fitted correctly before you adjust the trigger.

The reality is that the standard infantry No4 rifle had a trigger which could be anywhere around 5-8lbs. Unless the rifle was for a shooting team or it was a No4T the trigger was checked for safety and was not tuned for a fine, crisp release. With upwards of 800 rifles in a battalion the unit armourer simply did not have the time or in some cases may I say, the inclination.

So therefore if you are converting a No4 ensure the trigger is tuned to typically around 3lbs, anything less with an Enfield type trigger mechanism I would deem dangerous, anything more will affect accuracy.

Range testing

The moment of truth for me, all the effort, the choice of rifles, the precision engineering work to ensure the correct fitting of the scope all comes down to the next few shots.

The scope is set to zero and I Initially I laser bore sight the rifle, the scope should be fairly close. In Laidlers book, An Armourers prospective .303 No4(T) Sniper Rifle, Peter shows a chart for dry testing the No32 scope and describes the process. Duplicating this process is a good indicator that the scope has been correctly fitted. If this process fails there is something wrong and proceeding further may be wishful thinking.

There is no such thing as warming shots for a Sniper; the rifle must produce a first round hit with a cold barrel. I do not have an Enfield rest so therefore I shoot from a bench utilising shooting bags to minimise any human errors and my target is placed at 100yrds. My target consists of a black four inch square and I place the tip of the scopes reticle on the left or right hand bottom corner of the black square. There is good reason for this approach, magnification on these old scopes was minimal and in the case of the No32 I think I read they were x3.75, therefore you need to find a good reference point where your point of aim will be constant. The middle of the black square will not provide any consistency and your point of aim will always vary.

Shooting with a cold barrel I fire three rounds using factory ammo and check the group. The group must be 3" or less and within four inches of the point of aim. Using the scope drums I adjust onto the point of aim and let the rifle cool. Once cold I fire a further 3rds and repeat the group. My last rifle I built, achieved a 1.5" group.

You can I believe slip the scope drums, a process which I am not ofay with. However as Peter Laidler states in his books, "if it works leave it alone" the No32 scope is getting old now and is not as robust as in its heyday, adjusting the drums may break them and there is no easy access to spares.

Summary

My last rifle achieved a 1.5" group. That was achieved through a long process of rifle selection and precision engineering and it did have its worrying moments from time to time, however it is not always possible to guarantee that result every time as there are many things that potentially can go wrong, for example:

1. The scope is defective in some way.
2. Defective replica parts like the pads and scope bracket.
3. The rifle was not bench tested for accuracy prior to the conversion taking place.

Converting a No4 into No4T is a long and precise process, where a lot of patience is required, however success at the end I can honestly say is extremely rewarding as the picture below depicts.