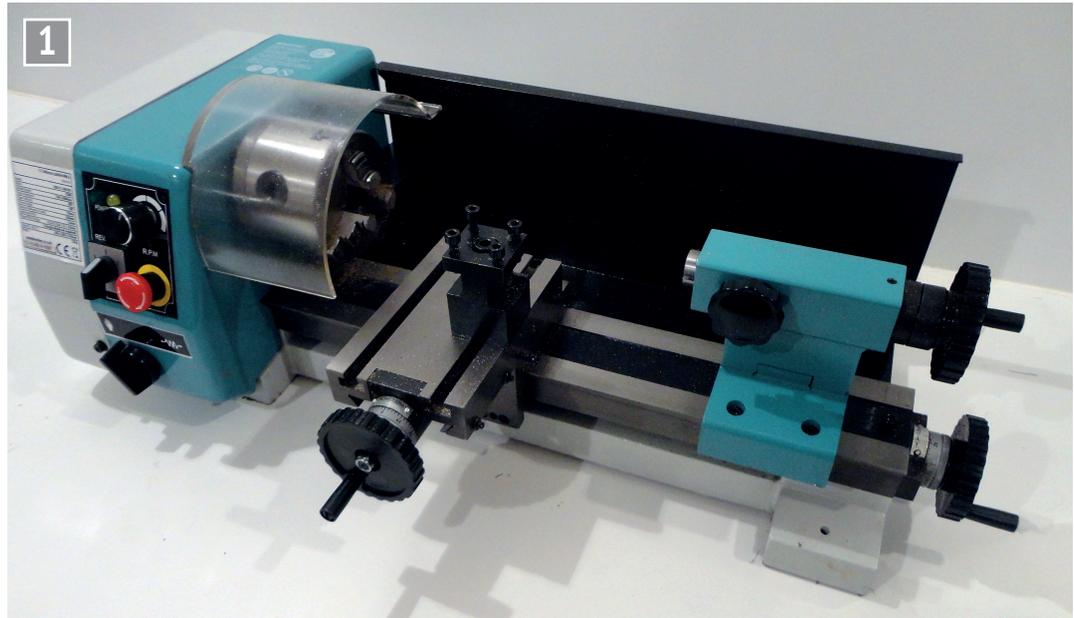


Matt Chapman reviews the Axminster Model Engineer Series C1 Micro Lathe and SX1 Micro Mill.



The C1 Micro Lathe.



The SX1 Micro Mill.

Tool Review

Introduction

The C1 Micro Lathe (photo 1) and SX1 Micro Mill (photo 2) are from the Axminster higher specification and extremely professional looking 'Model Engineer Series' of machine tools. The SX1 Micro Mill is the smallest in the series and the C1 Lathe the second smallest. The size and specification of the two machines is such that they complement each other perfectly and should deliver a highly capable package to the smaller model engineer's workshop. This article provides

a review of my experience of both machines from initial setting up straight 'out of the box' through to actual use over a number of weeks.

C1 Micro Lathe

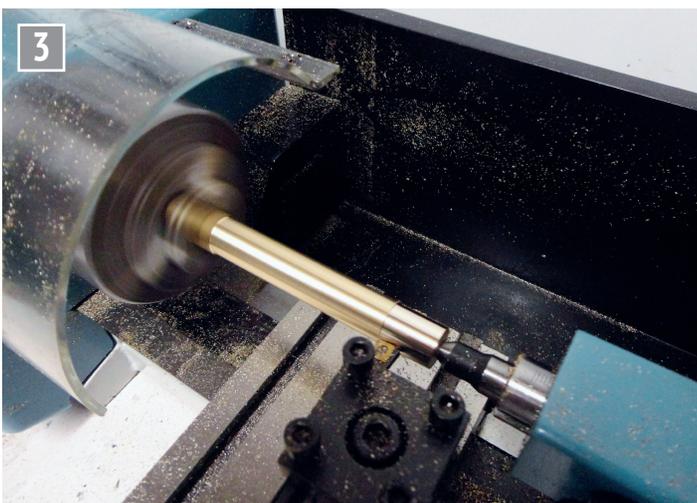
It has to be said that though very small, at a distance between centres of 250mm and a centre height of 70mm, the C1 has a lot of extremely useful features for a machine of this size. Perhaps most noteworthy is a powered lead screw giving automatic feed to the saddle and, for a modest

additional cost, a set of change gears adds the ability to screw cut a selection of metric threads.

Unboxing and Setup

The C1 is supplied firmly bolted within a sturdy wooden shipping crate and, once removed, weighing just 22 kg, is easily carried/manoeuvred around the workshop. Once unboxed the lathe has to be cleaned of the heavy corrosion preventative grease which should be replaced with good quality machine oil. Even with the handy oil applicator bottle supplied within the standard accessories I did find accessing the lead screw for oiling slightly tricky due to it being shrouded within the lathe bed with no easy access oiling point. Only a few items are required to fully assemble the C1 – predominantly the hand wheel handles and safety guard - these take minutes to fit.

Even though small, the lathe (and SX1 mill for that matter) must still be securely mounted to a rigid bed; three M6 clearance holes are provided for this purpose. Following mounting, the lathe



Turning on the C1 is vibration and chatter-free.



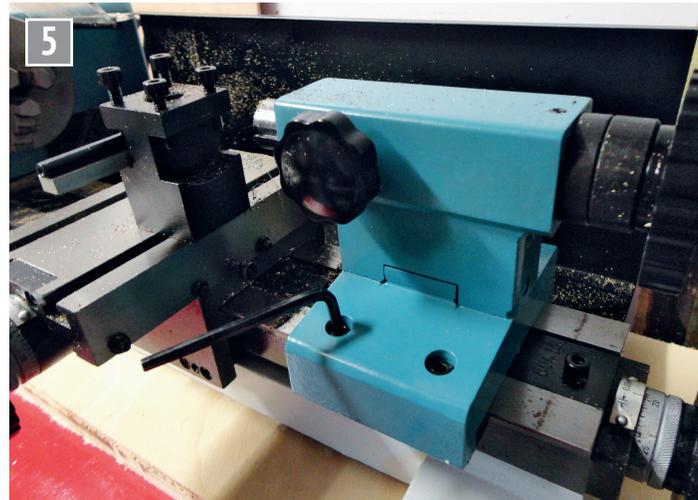
The clear and simple controls on the C1.

was inspected for accuracy and adjustment; I was quite interested in the results of these tests as the 'out of box' accuracy of machines of far eastern manufacture in general is sometimes criticized. The C1 spindle had barely measurable run-out, the tapered roller bearings proving effective here. The spindle clocked 100% true to the bed and the tailstock was in perfect alignment over the approximately 200mm tested - all in all a very impressive start.

The C1 In Use

The lathe on the whole is extremely smooth and quiet running; there is no discernible vibration or chatter when turning (**photo 3**). The controls of the lathe are clear and easy to use (**photo 4**) with the speed being electrically variable between 100 and 2000 rpm though there is no built-in indication of what the actual spindle speed is, as found on larger Axminster lathes. I have a cheap hand-held laser tachometer, which is a perfect remedy to this issue. The 150W motor performed faultlessly and has a surprising amount of torque though it would have been nice if the lathe had a slightly higher top speed which, at 2000 rpm, is perhaps slightly lower than ideal for a lathe of this size.

Although only a feature in the longitudinal axis, the automatic feed is a real asset and easy to engage/disengage. The lathe does not come with a compound slide, tools being mounted in tool post fitted directly to the top slide. A compound slide is available to purchase as an optional extra. The scales of both axes are clear and easy to read though I did find the graduations on the cross-slide frustrating to use. After a little experimentation I realized that each division, engraved as being 0.02mm, represents 0.02mm of physical cross slide movement and is not compensated for turning i.e. showing material removed off the workpiece diameter. Another slight frustration is that the larger divisions on the scale are a simple sum of



The tailstock is locked to the bed using two M5 screws.

the small divisions and not a measure of material removed in millimetres. Though these issues are relatively minor it is frustrating and slowing when trying to calculate depth of cut and the lack of diameter compensation could potentially lead to cutting double the amount of material required - in all likelihood on a critical cut! Replacing the scales is something I would consider exploring and being lucky enough to own a Taylor Hobson engraving machine have manufactured similar scales in the past.

Backlash on the cross slide was found to be 0.1mm and the lead screw to be approximately 0.25mm. There is no means of adjusting out the backlash.

The slideways are ground as opposed to scraped, but were smooth in operation and have effective gib strip adjustment.

The C1 spindle is bored to a 2MT taper and has a 10.5mm through hole for extended work pieces. The tailstock is bored to a 1MT taper. The tailstock is a substantial construction performing faultlessly in all operations. There are a couple of ergonomic issues I found with the tailstock. Firstly, the means of locking the assembly to the bed of the lathe is via two M5 cap head screws (**photo 5**) which of course becomes frustrating quite quickly. I think my first modification to the machine would be to replace these screws for locking levers of

'Bristol' pattern or similar. A second minor issue I found with the tailstock is a slightly limited 20mm of barrel travel that is slightly annoying when drilling deeper holes - of course the replacement locking levers would help speed up the process of shuffling the tailstock forward for deep hole drilling.

The C1 is supplied with a good range of accessories with many more available for an extra cost. The supplied 3-jaw chuck with reversible jaws is not the smoothest in operation but was found perfectly adequate in use.

Overall the C1 is a really capable little lathe and, a few minor ergonomic issues aside, a real pleasure to use. The lathe is really smooth in operation, quiet and surprisingly rigid - even coping well with intermittent cuts. Being as small as it is it is easily portable and perfect for the smaller workshop where it can easily be stored out the way when not in use.



The SX1 mill emerges from its packaging.

SX1 Micro Mill

The SX1 is advertised as a mill/drill and has the capability of tilting the column 45 degrees either side of the vertical. Its working envelope is 255mm from the nose of the spindle to the table (Z-axis), 180mm of longitudinal table (X-axis) movement and 90mm lateral (Y-axis).

Unboxing and Setup

Being somewhat heavier than the C1 lathe at 32kg the SX1 requires a little more effort and care when unboxing. My technique in the end was to remove the top and one side panel from the crate and slide the mill onto the workbench (**photo 6**).

The first step once again is the removal of the corrosion preventative grease; it was a slight shame that this had soaked into and damaged the control decals somewhat (**photo 7**). I am a fan of the Axminster Model Engineer Series colour scheme but on the SX1 under review there



The control decal was slightly damaged by the rust preventative oil.

were one or two areas in which this paint was quite damaged (**photo 8**). Assembly once again was a breeze, limited to just attaching the hand wheel handles.

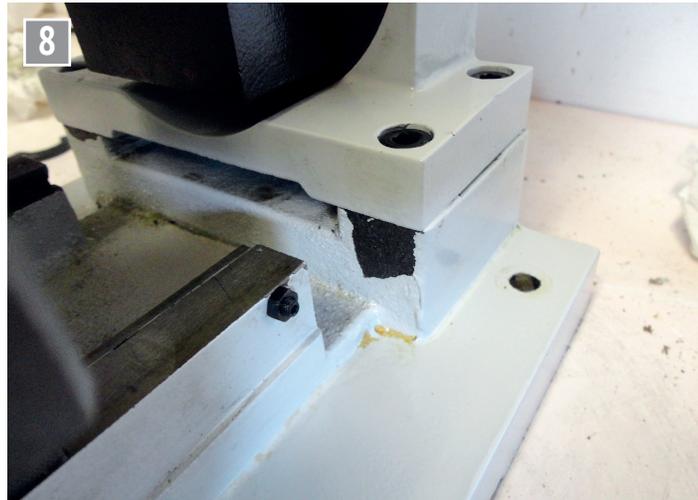
Before use a series of tests was conducted and the machine was found to be in a really well setup condition. Of particular note was that even taking into account the adjustable column and transit the machine had been through, the tram of the mill head was only 0.03mm over the full 240mm length of the table. The quill clocked perfectly perpendicular to the table which I have found to be slightly out on similar machines.

Standard accessories include a 10mm drill chuck, selection of hand tools and 4 'T' nuts – there is no other clamping kit provided to go with the 'T' nuts which I find slightly odd as they are a little superfluous on their own, especially to someone starting out in the hobby with no other tooling. That said there is wide range of accessories including clamping equipment available from Axminster at extra cost.

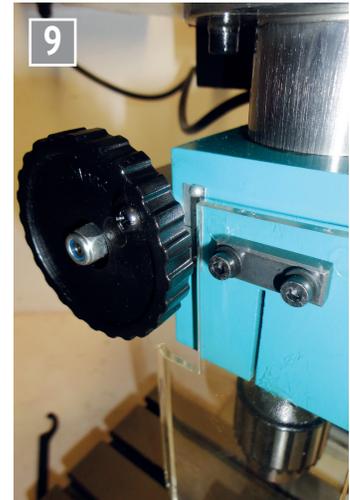
The SX1 in Use

The 150W motor drives the spindle through a two-speed (high and low ratio) gearbox with plastic gears. This gearbox works perfectly well and it is easy to change between the two speeds although it does make for quite noisy running – nothing earth shattering just noticeably noisier next to the smooth running C1 Lathe. The speed of the motor is electronically controlled from 100 to 2000rpm in high ratio but again there is no feedback on the actual spindle speed. The motor is plenty powerful enough and didn't flinch through the quite demanding use I exposed it to with a range of tools and materials.

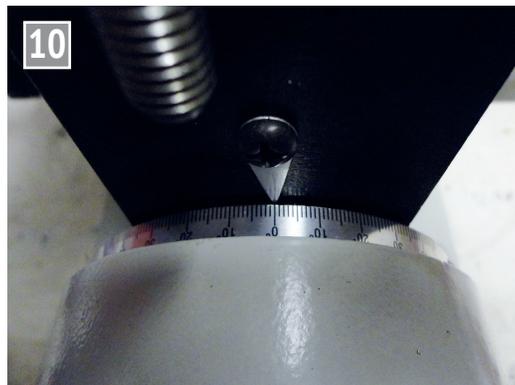
The spindle is bored to accept 2MT and the mill is supplied with an M10 threaded draw bar. I did find the spindle guard slightly frustrating (to be fair I don't think I have used a



There were some small areas of damage to the paintwork.



The safety guard is difficult to remove.



Column tilt graduations.



The slide clamps are simply M5 screws.

guard I didn't find frustrating! Safety first though...) in that it is rigidly fixed with no means of folding out the way (**photo 9**) – I think a simple modification introducing a hinge would be sensible here. Also note in photo 9 that the guard and fine feed hand wheel make it very difficult to read the fine feed scale.

Handles for both the X and Y-axes were smooth and easy to operate with the dials being crisply engraved with 0.025 mm divisions.

The Z-axis and column tilt include a coarse linear scale for approximate setting (**photo 10**) with the quill fine feed dials being engraved with 0.05 mm increments.

The X and Y axes had 0.1mm of backlash. A means is provided to adjust out backlash in the X and Y axes only and this is through the lead screw nuts having a slot cut half way through the nut that runs parallel with the threads. There are then two socket head adjustment screws that

allow this slot to be closed slightly thereby adjusting the backlash out. The slideways are ground as opposed to scraped but were smooth in operation and have effective gib strip adjustment. The slide clamps are simple cap head screws (**photo 11**) which, space permitting, I would swap for locking levers similar to that which is provided for the Z-axis (head clamp).

The head is partially slotted and an M8 cap head screw used to clamp the quill; again this may benefit from being replaced with a locking lever for ease of use. With the quill, head and all axes not being used firmly locked up and sensible cutting loads I found the SX1 to be perfectly rigid when milling with no chatter at all.

Overall, I would highly recommend the C1 and SX1 as the perfect beginner's package. They are delivered at a perfect level of adjustment which, combined with a minimal amount of setup,

makes them ready for work straight away. Beginners aside, both machines are robust and highly capable making them equally suitable for the smaller more experienced engineers workshop. The ability to store the machines away under a bench or on a shelf could make them an additional asset to already established larger workshops; I am sure we have all had been in a position with a complex and lengthy setup taking up our primary machines and another quick job is required...

It is worth noting that both the C1, SX1 and Model Engineer Series generally, carry a standard 3-year guarantee supplied free of charge from Axminster which, combined with the well known and fantastic customer support, are additional attractive features of the overall package. Full details on the exact specifications of both the C1 and SX1 can be found on the Axminster website: www.axminster.co.uk. ME