

**NPL-015**  
**Alan Keef K12**  
**diesel locomotive**



Thank you for purchasing this Narrow Planet kit, we hope you enjoy building and operating it. Please read through the instructions thoroughly before beginning assembly.

**Tools required:**

- |                              |                           |
|------------------------------|---------------------------|
| Sharp craft knife or scalpel | 0.4mm drill               |
| Hold-and-Fold (or similar)   | Superglue                 |
| Tweezers                     | Scissors                  |
| Emery paper or boards        | Soldering iron and solder |
| Small files                  |                           |

**Prototype Info**

The K12 diesel locomotive, designed and built by Alan Keef Ltd, was intended to provide a simple but effective power unit for use on lightly laid and temporary tracks. Six locomotives were built between 1976 and 1982, all of which were initially destined for use on British peat railways. This kit is based upon AK6 of 1981 which was originally built for working on a 2' 6" gauge line but has since been regauged to 15"; making it a good match for both OO9 and OO6.5. A complete history of the K12 class can be found in issue 119 of Narrow Gauge and Industrial Railway Modelling REVIEW.

**About the kit**

This kit is comprised of a 3D printed plastic footplate and detailing parts along with a fret of etched nickel silver body parts. The nickel silver parts are quite complex in nature, but the folds required are all straightforward and fully described below. The parts can all be glued together although soldering the body will give a more robust model. A small amount of soldering is also necessary to complete the electrical connections. Full assembly instructions are given below.

Due to the nature of the 3D printing process, some support material may still be present on bottom-facing edges of the body shell and detailing parts. The plastic used has similar properties to the ABS commonly used in injection-moulded kits and may be easily cleaned up with a sharp knife and fine emery boards.

The kit can be built for either OO9 or OO6.5 and requires a KATO Centram (or Portram) chassis or Busch 12199 HOF accessory chassis respectively. Slight modifications are required to either chassis, which are detailed in these instructions.

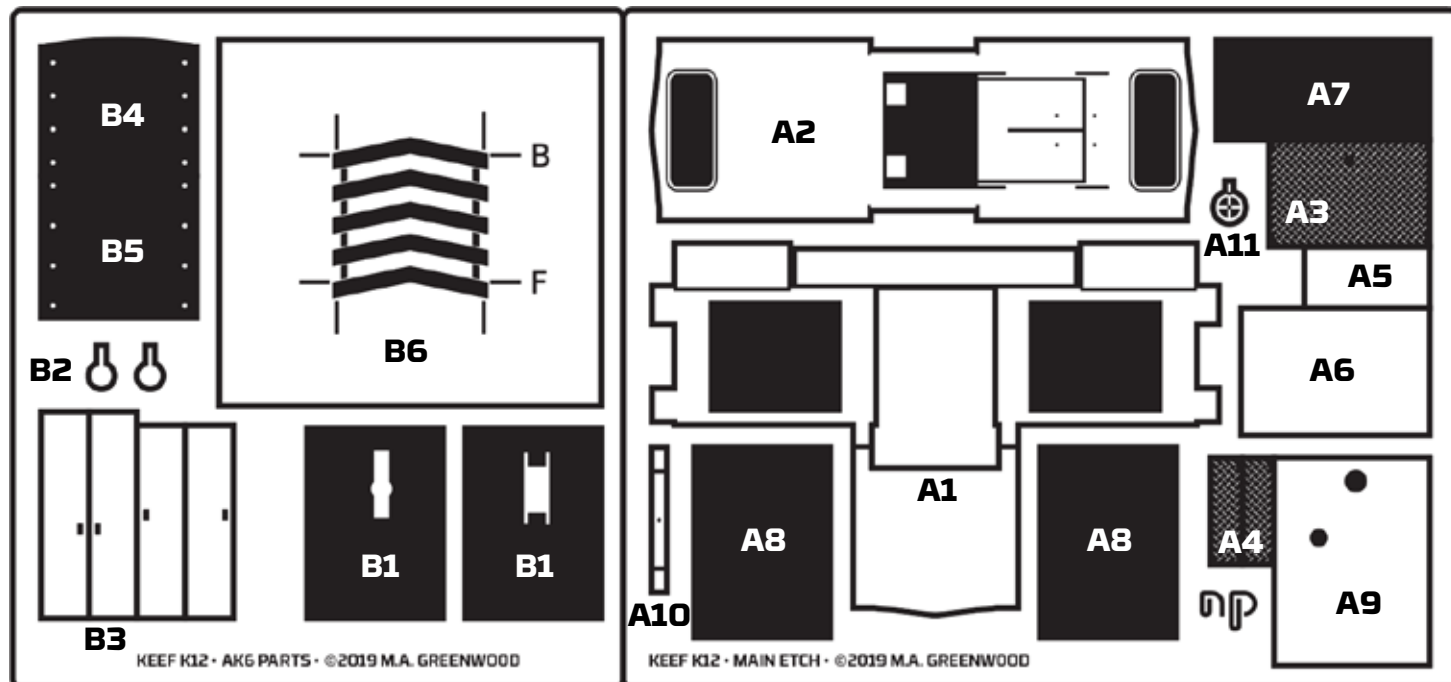
All etched parts should be removed from the fret using a sharp knife and then any remaining tag gently filed away. We also recommend gently scoring along fold lines as this helps the metal to bend cleanly. Many of the folds are close to the edge of parts making them tricky to fold without the use of a Hold-and-Fold or similar tool. **Trying to fold these parts using pliers is likely to fail.**

Please note this is a scale model for adult collectors, and not intended for children under 14 years of age.

**Assembling the Etched Body**

**1** • Remove the main bonnet part from the etch (**A1**) and prepare the part (clean up the edges and lightly score the folds).

**2** • The first fold will bring the bonnet front in line with the side panels. This fold is an underfold which means that contrary to normal the half etch line is on the outside rather than the inside of the fold. We strongly recommend that a Hold-and-Fold, or similar, is used for all folds within this kit, but it is especially important here, as it helps to ensure that both sides are folded along the same line, which ensures the bonnet is square once fully assembled. Before complet-



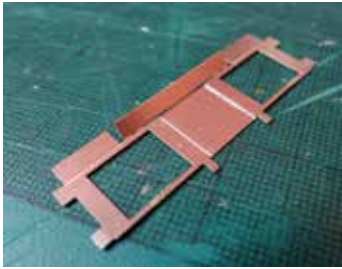


**Fig 1: Halfway through the first fold.**

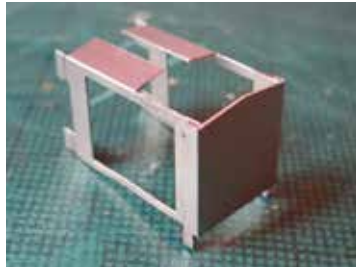
ing the fold gently apply super glue (or solder) to the inside of the front panel taking care not to get any in the half etched rebates - marked with red pen in the photo. Use pliers to ensure the tabs are squashed flat at the fold.

**3** • Trim the two pieces of wire mesh so that they fit within the large openings in the side panel; ensuring they are the correct size is easier at this stage when the part is flat, although they are glued into place later.

**4** • The next step is to remove the sacrificial strip that joins the two sides of the bonnet together; until this is removed the bonnet cannot be folded to shape. The strip can be removed by gently bending it backwards and forwards along the dashed fold line. Once removed gently file away any remaining sections of the fold.



**Fig 2: Remove the sacrificial strip by gentle bending.**



**Fig 3: The completed bonnet shell.**

**5** • Gently fold the two sides of the bonnet back from the central front piece. Be careful when doing this as glue holding the sides together may start to break if the part is not properly supported during folding.

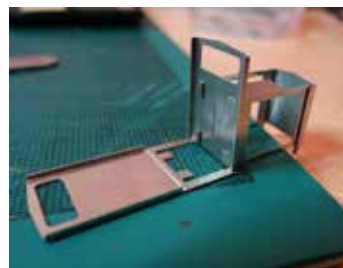
**6** • Gently bend the tabs on the top of each bonnet side so that the angle they form matches the angle of the peak on the bonnet front.

**7** • Before removing the cab from the etch (**A2**) drill out one of the four control handle half-etch holes. Which hole you open up usually depends on which side you fit the cab wall, and if you want it high or low. As always check prototype photos if you are modelling a specific loco at a particular time. If you are building the **OO6.5** version then you need to also remove the panel from the cab front by carefully cutting along the half etched lines and then cleaning up the cuts with a small file. You'll also need to gently remove the two tabs from the floor of the cab and file the edge flat in order for the Busch chassis to fit. Now remove the cab from the etch.

**8** • Begin folding the cab by folding the four door edges at right angles to the walls. This is best done using a Hold-and-Fold and folding both edges on one side of the etch at the same time. Now fold the front wall of the cab so it's at right angles to the floor (don't fold the rear wall up yet).



**Fig 4: Using a Hold-and-Fold to fold two of the door edges in one go.**



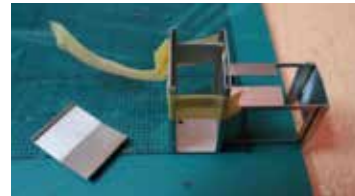
**Fig 5: The bonnet and cab glued together.**

**9** • Slot the tabs on the bonnet sides through the front cab wall. Sit the two parts on a flat surface with the tabs at the front of the bonnet off the edge so that the cab and bonnet sides both sit flat. Ensure the bonnet is pushed as far into the cab and then fold the four tabs towards the centre of the front cab wall. This will hold the parts together but with a little wiggle room. If gluing the parts, wiggle the bonnet slightly loose and apply glue to the two joints then push the two halves together tightly while the glue dries ensuring that they remain level on the flat surface. Otherwise if soldering ensure

the parts are firmly pushed together before soldering. Note that if building the **OO6.5** version there isn't anything for the bottom tabs to grip so you need to take extra care to ensure the two parts are joined accurately.

**10** • Once you are sure the glue has set fully, use a knife to gently open the tabs back up and then gently bend them backwards and forwards until they break off. Now gently file any remaining stub flat with the front wall; you could even use a little filler to try and hide them further if you wanted. If you've managed to glue the tabs to the cab wall then gently file the tabs away.

**11** • The next step is to fit the floor of the cab. For the **OO9** version there is a single etch piece spanning the whole cab floor (**A3**), while for **OO6.5** there are two small pieces (**A4**). If you are fitting a cab side wall then you only need to fit one of the small pieces in **OO6.5** as the other would be hidden behind the chassis. The floor pieces should fit snugly against the front cab wall, and slide under the folded edges. The **OO9** piece has a square hole; this should be towards the rear of the loco. The **OO6.5** pieces have two corners where the pattern doesn't extend and these should be against the door of the cab so that the corners fit under the door edges. Make sure it really is as far forwards as possible to avoid fouling the fold line for the rear wall; if it looks like it might foul the fold then file the edge careful to reduce the size of the part slightly before gluing it in place. If building the **OO9** version be careful not to get glue on the two tabs under the floor.



**Fig 6: Using the seat to position the rear cab wall.**

**12** • Remove the seat from the fret (**A5**) and fold down the edges. The seat isn't the most detailed component so you could replace it with something better (tractor seats seem to have appeared on lots of the prototype locos at one point or another) but even if you choose not to fit it, it's used at this stage

to help ensure the rear wall is vertical and to hold the parts in place while fitting the cab wall and roof. The unused floor pieces can also be used in the same way. See Figure 6 as an example of using masking tape and the seat to correctly position the rear wall.

**13** • Remove the roof from the etch (**A6**) and fold it gently to match the peak of the cab walls, then fold the edges down carefully to help the roof grip the cab. Note that one side of the roof has a half etched rebate. This is where the side wall slots into, so ensure that you glue (or solder) the roof on the right way around to match which side you want the opening (assuming you don't want an opening on both sides). Try and ensure the roof overhangs the walls equally front and back.

**14** • This is a good time to fit the seat, as with openings on both side of the cab it's easier to figure out the correct height depending on the driver figure you wish to use. Once you've settled on a height (a stack of four wooden coffee stirrers in our case), glue or solder the seat in place.



**Fig 7: The cab side wall in place.**



**Fig 8: Laminated AK6 specific side panels.**

**15** • Now glue (or solder) the cab side wall (**A7**) in place, ensuring you slide it under the edge of the roof and into the half etched rebate, which should help ensure it sits vertically.

**16** • The next step is to fit the bonnet side panels. Two sets are provided, a generic pair (**A8**) that matches most of the prototype locos and an AK6 specific pair (**B1**). In both cases they are fitted with the large opening towards the front of the loco, and the little opening upwards. If fitting the AK6 specific set then these need small extra details (**B2**) laminating on before they are fitted to the loco. These extra details should have the straight section pointing towards the front of the loco (see Figure 8).

**17** • Fit the bonnet side panels (ensuring they go on the correct sides) by sliding them into the half etch slot behind the front wrap around on the bonnet. Make sure they are then slid flush against the cab wall and that they align correctly with the bottom of the bonnet sides. If you keep the model on a flat surface (front tabs off the edge) then this is easy to achieve by sliding them flush against the mat and cab as you glue (or solder) them in place. Once in place I find it useful to use pliers (the smooth faced kind) to squeeze the parts slightly to ensure they have laminated properly and to help close up any gap between the front wrap around and the side panel.

**18** • Now run a small amount of glue around the large hole on the inside of each side panel and fit the mesh you prepared earlier; it shouldn't extend far enough to cover the small hole. Try and ensure that the weave is square to the hole for the best appearance. Again pliers can help in squeezing the mesh against the panel to ensure the glue grabs nice and easy. It's important (especially if building for OO6.5) that once fitted the mesh sits flush within the internal face of the side panels to ensure the chassis fits without shorting out!

**19** • Next remove the bonnet roof from the etch (**A9**) and fold gently along the centre line to match the peak of the bonnet front, and fold down the edges so they are vertical. Again you'll need to do the last step in a hold and fold as the fold line is too long and close to the edge to use pliers. Now carefully check that the tabs on the bonnet sides are at the correct angle to support the bonnet roof and that it fits well at the front and then glue it in place; the holes in the bonnet should be towards the front of the locomotive.

**20** • To build the brake stand remove the stand (**A10**) and wheel (**A11**) from the etch. Slide the 0.3mm wire through the hole in the stand and then fold the stand around the wire (leave the tabs at the bottom unfolded for now) leaving a small amount of wire protruding from the top. Glue the wheel to the wire at the top of the stand, then fold the handle vertically and trim off any remaining wire above the wheel. We recommend painting the stand separately and fitting as a final detailing piece after painting the inside of the cab. When you do come to fit it, slide it gently down through the hole in the cab floor and then bend the tabs outwards and glue them to the underside of the floor. Trim the wire so it's just below floor level.



**Fig 9:** Completed brake wheel prior to fitting.



**Fig 10:** The mesh fitted and the locating tabs bent downwards.

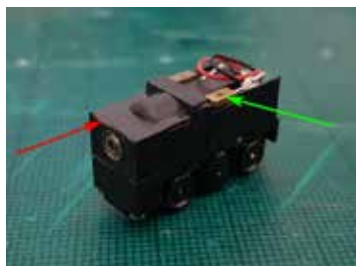
**21** • If building for OO9 then gently fold the two tabs under the cab floor downwards, see Figure 10.

## Assembling the Chassis and Footplate

**1** • Very carefully separate the 3D printed detail parts from the footplate. You will find that as well as the footplate itself, there are two buffer blocks, two parts of the AK6-specific armour plating, and the bottom half of the exhaust pipe. The OO9 version also includes the pickup mounting clip for use with the KATO Portram/Centram chassis. It should be possible to separate the parts using a sharp modelling knife or cutters and then use small files to remove any remaining sprue material.



**Fig 11:** Trial fitting the body to the footplate.



**Fig 12:** The Busch HO chassis modified to fit this kit.

**2** • The 3D printed footplate has slots in to which the tabs on the etched body fit. These should be a tight fit, but check to make sure the holes are large enough. If necessary running a file over the tabs to thin them slightly will help the two parts fit together properly.

**3a** • If using the Busch chassis for OO6.5 then the only modification required is to gently sand the slight overhang at the rear top of the chassis flat (the red arrow in Figure 12). It's also worth checking that the small copper boards that hold the pickup wires in place are square to the chassis, to avoid them shorting out on the etched body (the green arrow in Figure 12). The chassis should then slide through the centre of the 3D printed footplate and be held in place by friction, meaning it can be removed easily from the completed model.

**3b** • The KATO Portram/Centram chassis used for the OO9 model requires a little more work. Firstly some of the plastic needs gently cutting away to make it fit within the confines of the model. This involves cutting off most of the tongue of plastic from one end as well as removing the overhanging plastic flaps from the side of the chassis. Do this gently and keep checking the chassis against the footplate so you can work out when you have removed enough material. Figure 13 shows a modified chassis alongside an unmodified one to help guide you in this step.



**Fig 13:** The modified KATO chassis at the bottom, with an unmodified example for comparison.



**Fig 14:** A close up of the 3D printed clip holding the phosphor bronze rods in place against the pickups.

As well as modifying the shape of the chassis, the power connections also have to be completed. As the chassis is not designed to run on the usual 12V DC supply, the easiest way of protecting it is to re-use the control circuit board from the original KATO tram. While the motor wires plug into the circuit board, there are no wires connecting to the pickups. Firstly solder two short lengths of wire to the two pins either side of the plug for the motor. The two large pins in the centre of the board should be cut down to the board level (they could be used to power working lights but that's beyond the scope of these instructions).

To avoid needing to solder directly to the chassis and risk damaging the plastic gears it contains, a 3D printed clip is included in the kit which holds two phosphor bronze rods in place. Soldering wires to these rods can be done away from the chassis without fear of damaging it. Take the two wires you soldered to the circuit board and solder each to the middle of one of the rods; try and keep the wires as short as possible and one side of the rod free of solder so it can sit flat on the chassis. Now slide the rods into the grooves in the clip, and then push the clip into the square hole on the chassis so the rods are sprung against the pickup tags. See Figure 14 for a clear view of the clip in use. Note that you want to ensure that the wire from the pin nearest the red motor wire on the circuit board attaches to the pickup on the side the red wire leaves the chassis; see Figure 13. The clip is designed to stay in place using friction alone, but if you feel it might be loose then apply a little superglue to the outer edges to fix it in place. Now slide the chassis into the footplate (the 3D printed pickup clip goes towards the front of the loco) and check that it moves correctly under power. If you've connected the wires the wrong way around simply swap the rods around.



**Fig 15:** The completed KATO chassis. We recommend black tape to stop the board showing through the side grilles.

Once you are happy that the wiring is complete, wrap the circuit board in a small amount of electrical or masking tape to ensure that there is no chance of a short against the etched body. Figure 15 shows the completed modified chassis.

## Final Assembly and Detailing

1 • The exhaust is constructed from a 3D printed mounting and a 5mm long piece of fine tubing. First check that the tube is just 5mm long, and then carefully slide it fully into the tube on the mounting part. Be careful not to force it as it is easy to break the 3D print. Open the hole slightly with a small drill if necessary. Once the model is painted the exhaust can be slid through the hole in the bonnet and secured in place with a small amount of superglue; the tops of the mounting are angled to match the inside of the bonnet roof and should help you position the exhaust centrally within the hole.

2 • If you are adding the armour plating, as seen on AK6 then, remove the four U channel parts from the etch (**B3**) and carefully fold them to shape. Also remove the front (**B4**) and back (**B5**) armour plates. Assembly of the front and back sections is essentially the same;



Fig 16: Assembled armour plates (rear on the left, front on the right).

the front section uses the shorter U channels and the curved top plate along with the 3D print with only two legs rather than three. Assemble by gluing the U channel to the printed part (making sure to get them the right way up so that the bottom of the channel lines up with the bottom of the legs on the printed piece) and then glue the armour plate on ensuring that the U channels are vertical and align with the edge of the plate. Both front and back the top corners of the plate should align with the top of the U channel pieces (this will mean they rest on top of the buffer blocks once fitted).

3 • Two control handles made from 0.3mm wire can now be fitted inside the cab. One handle should be fitted through the hole in the cab front wall, while the other goes through the large slot in the wall. Both should be made from a piece of wire containing a 90 degree bend and secured using a small amount of superglue applied from inside the bonnet.

4 • The buffer blocks also double as mounting points for couplings. In **OO9** a small piece of wire should be threaded through the hole in the top of the buffer and secured with glue, leaving a vertical pin which will be at the correct height to mate with Greenwich-style couplings. In **OO6.5** the small disc magnets supplied should be glued centrally within the slot in the buffer block. The buffer blocks either slot directly into the buffer beams or into the holes in the armour plating pieces, which in turn fit into the buffer beams. If using the armour plating then this does raise the couplings slightly so in **OO6.5** you need to fit the buffers upside down (slot downwards) to ensure the magnet stays at the correct height above the rails. The buffers are designed to be a tight fit within the buffer beam, and the pins may need filing slightly to avoid needing to force them into place.

## Painting

The completed model can be painted using any of the common modelling paints (acrylic or enamel). An initial layer of primer is recommended to provide a consistent surface and colour as a basis for final painting. Whilst the model can of course be painted any colour, Alan Keef Ltd locomotives are traditionally painted orange with black frames and red axle boxes and buffer blocks. The orange body colour used on the prototype is RAL 2004, and a number of model paints are claimed to be the same shade. We used Humbrol 18 Orange Gloss, but Model Air 71.083 or Model Colour 70.851 both from Vallejo appear to also be RAL 2004.

Our test models were painted as follows:

1 • All the parts were first sprayed with a grey primer. The 3D printed footplate was then sprayed matt black, before being masked up so that the axle boxes could be picked out in red by hand. The buffer blocks were also painted red by hand. The inside cab walls were hand painted in ivory (white is too stark on a model) and the floor and side panel mesh painted black before being carefully masked and sprayed orange. Detailing parts, such as the brake wheel and exhaust, were carefully brush painted as appropriate.

2 • A stencil is provided on the etch (**B6**) to aid in painting the wasp stripes onto the AK6 armour plating. The fronts of the plates were sprayed yellow and allowed to fully dry. The plates were then carefully taped to the stencil using masking tape. There are two lines marked F and B on the stencil and the front and back plates should

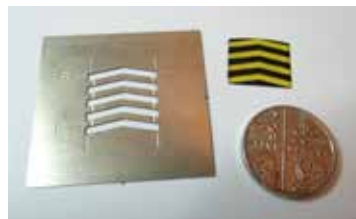


Fig 17: The rear of the etched stencil along with a test piece (yours would be already assembled to the U channels etc.).

be aligned with the matching line; the bolt detail on the plates should sit within the small half etches on the rear of the stencil allowing the plate to sit flush against it. The plates were then lightly sprayed black (you don't want too much paint as it can build up against the edge of the stencil) and allowed to dry for a few minutes before being removed from the stencil and then set aside to dry fully. The

remainder of the armour plating (the U channels and the rear of the plate) were then carefully brush painted black.

3 • Once all the parts were painted, the model was fully assembled before being sprayed with Testors Dullcote to bring all the colours together with a consistent finish. The windows were then glazed using Micro Krystal Klear.



Fig 17: The completed model in OO9 seen with one of our forthcoming etched peat wagons.

## Further reading

*Narrow Gauge and Industrial Railway Modelling REVIEW*, issue 119.  
<https://narrowgaugeandindustrial.co.uk/>

## Acknowledgements

We would like to thank Alan Keef, Patrick Keef, and the owners of the extant K12 locomotives (especially John Tennent) for their invaluable help while researching the prototype. Also our thanks to the many members of NGRM-Online who provided feedback and support during the development of this kit.

## About Narrow Planet

Narrow Planet was founded in 2010 and offers a custom etching service for unique nameplates, works plates and number plates for your model railway locos and stock. In any size or shape from 2mm:ft to 7/8":ft scales. Many manufacturers' styles are available, our full range and ordering information can be found on our website.

This kit was designed by Mark A. Greenwood. If you have any queries about the model or instructions please get in touch.

## Contact Details

[www.narrowplanet.co.uk](http://www.narrowplanet.co.uk)  
[info@narrowplanet.co.uk](mailto:info@narrowplanet.co.uk)

Narrow Planet, PO Box 297,  
Bexhill-on-Sea, TN40 9HF

NPL-015 • first issue • October 2019