Graham Farish Castle class 2FS conversion instructions

Parts required in addition to the etch

3 060 spoked bogie wheels (2 pairs)

3 015 Spoked driving wheels 13mm (3 pairs)

3 221 Conversion bearings (6)

3 222 Gear muff (1)

3 223 Small muff (2)

Material for crank pins – either 0.5mm brass rod or 3 106 Association crank pins

3 103 muffs for bogie (only 2 needed, come in packs of 10)

3 113 Frame bush (only 4 needed, come in packs of 10)

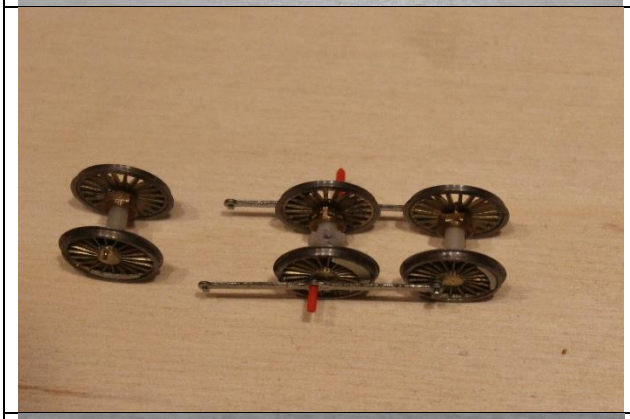
Small piece 0.5mm double sided PCB

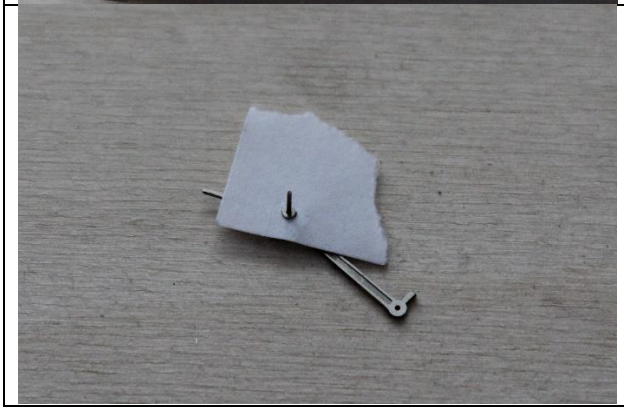
Glue – Thick superglue or epoxy recommended

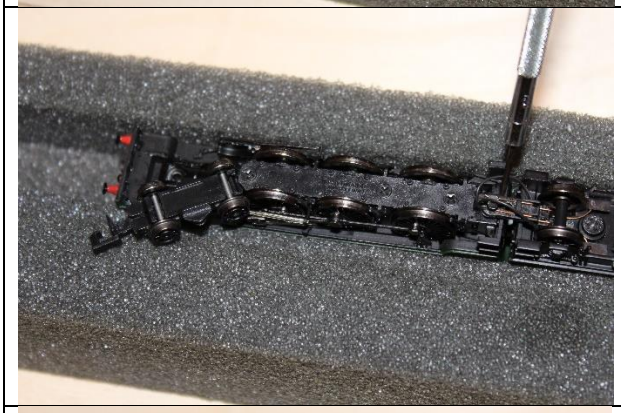
Paint – don't forget the primer

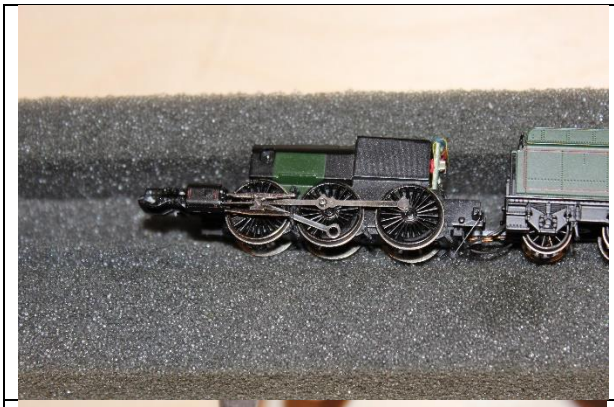
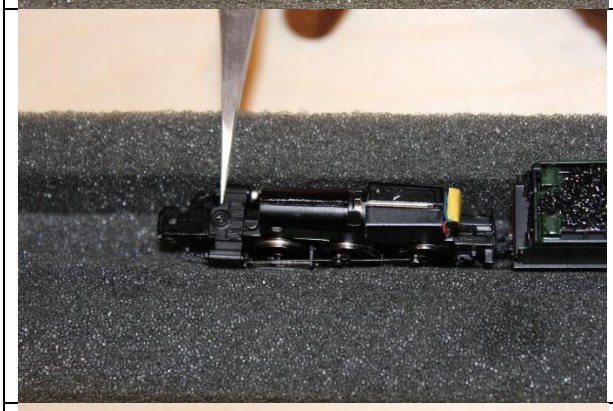
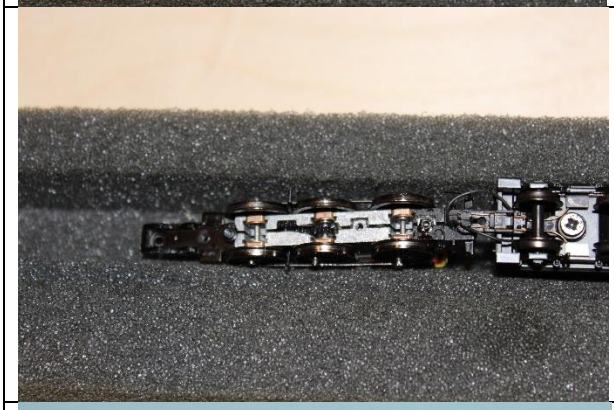
This conversion only covers the locomotive and not the tender. The tender wheels can be turned to a reasonable width and suitable flange by the Association wheel turning service. Alternatively find a member who could centre drill tender wheels and insert 1mm wagon axle steel.

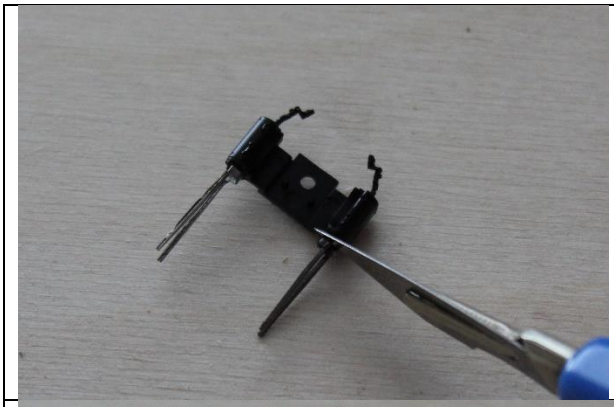
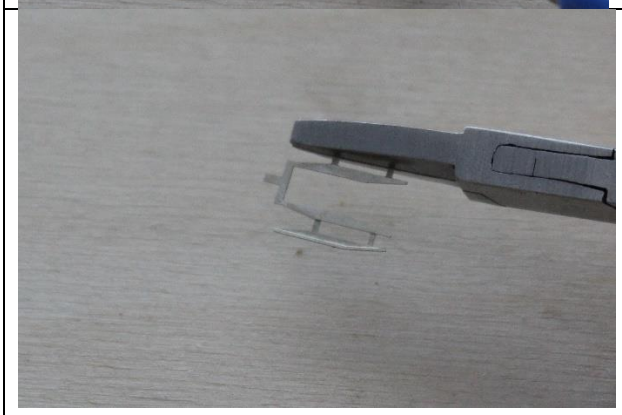
	One N scale Graham Farish Castle. Nice model, but odd shaped wheels and a lot of daylight through the front. The following is a suggested order of construction. If you choose a different order, you may encounter difficulties not covered here.
	Prepare the 13mm driving wheels with the balance weights and crank pins of your choice. 0.5mm brass wire can be bent and soldered in place as an alternative to machined pins. The balance weights can be secured using epoxy or thick superglue according to preference.

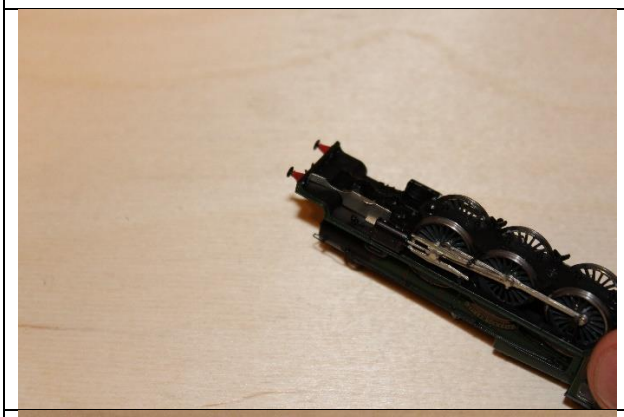
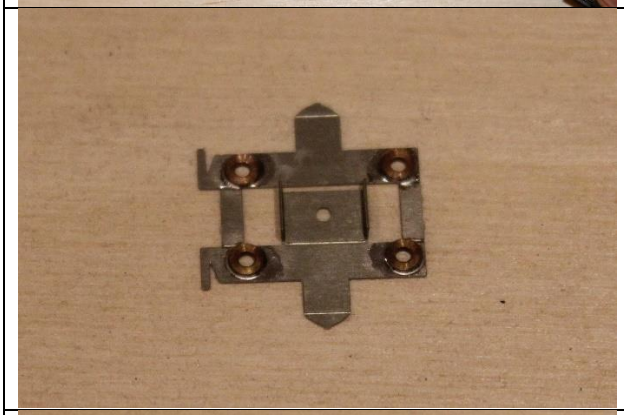
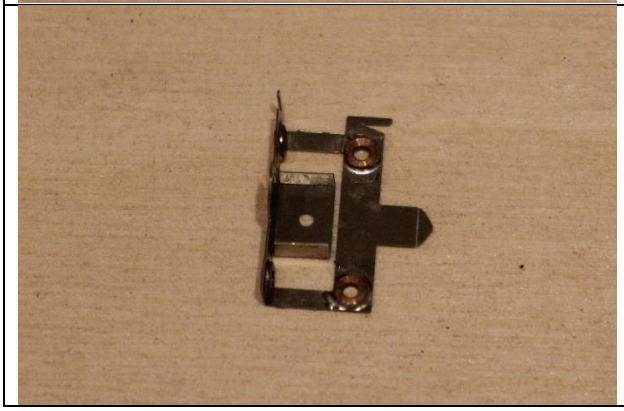
	Due to the method of construction, the Association quartering tool is highly recommended as the axles can be prepared prior to fitting. As the centre axle won't turn once fitted, any quartering by eye has to be pretty accurate, but it can be done. Put the conversion bearings onto the axles before fitting the muffs. Check the back to back at this stage.
	This shot shows the three axles assembled and the use of insulating sleeve to retain the centre crank pin. DO NOT Solder all crank pins on at this stage as the slide bar supports will prevent fitting.
	Remove the coupling rods from the etch and fold. All fold lines are on the inside. Solder the two halves together.
	If you want to maximise the space behind the valve gear, you can remove the front boss on the outside of each rod leaving just the one thickness and sufficient clearance for the crank pin. The mock hinge sits behind the centre axle crank pin.

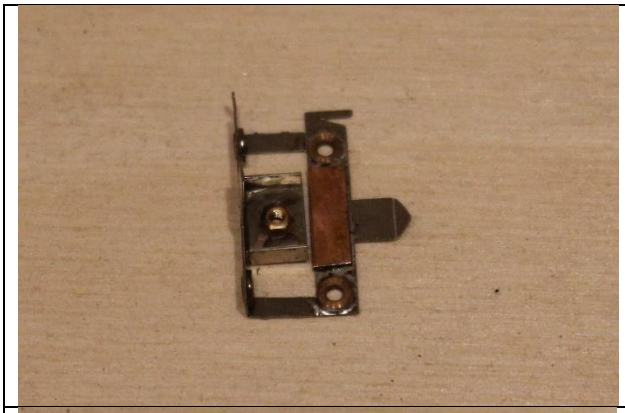
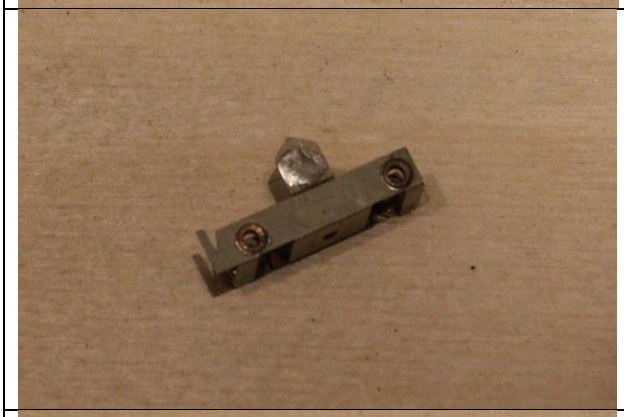
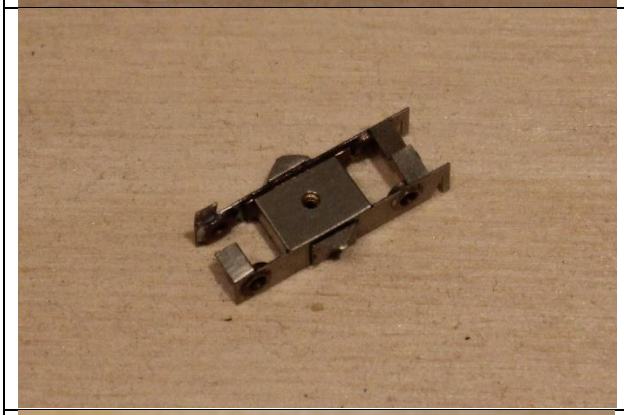
	Take the crosshead etches and fold over the two matching parts and solder together.
	Once done, fold over the larger part and solder again, ensuring that the pivot hole is aligned. It is normal to have to clear solder with a 0.5 mm drill and reamer after each stage.
	The crosshead is not a full four layer sandwich due to space constraints. The ears on the connecting rod retain the rear of the crossheads. Take a piece of 0.5mm brass rod and drill a hole in a piece of wood to retain the rod. After folding and soldering the connecting rods, fit the eared end over the rod face down and solder in place.
	After filing back and leaving the rod sticking out the front, place the crosshead over the pivot rod, use a piece of paper as a separator, then solder on a washer.

	After cleaning up you should have a unit that looks like this with the narrow section in the middle, the larger bit of the crosshead on the outside and the ear of the connecting rod on the inside. Also trim the folded tab at the other end of the connecting rod to resemble the oil point.
	Now take the model apart. The main screw that retains the body is above the front bogie being pointed out here.
	At the rear of the footplate, a lug secures the rear of the chassis. A small screwdriver inserted will pull back the rear of he body moulding and release the chassis.
	Pull the body off vertically. Do not try to twist or tilt – it is a tight fit, but will slide in the right direction.

	Due to the moulding that supports the rear of the slide bars, it is necessary to take off the coupling rods before removing the wheels. Unscrew the centre and rear crank pins, remove the connecting rods and leave the coupling rods attached to the front axle.
	The cylinder assembly is secured using the screw shown.
	Now unscrew the three retaining screws and remove the keeper plate. Remove the three axles.
	Fit the association wheels, keeper plate and coupling rods, using insulating sleeve as temporary securing for the rods. Put a crankpin washer on each pin before fitting the rods to space out the rods and clear the balance weights. Test the running and quartering at this stage.

	The old slide bars are secured to the cylinder block with a superglue type adhesive. A craft knife at the very front of the bars should crack the glue and allow the bars to be removed. Clean up the cylinder block of any old dry glue.
	Remove the new slide bar etches from the frame. Firstly fold the half-etched faces by holding with flat pliers and carefully lining up with the backing. This is the only fold in the kit where the half-etch is on the outside of the fold. Solder the two halves together from the plain side ensuring no marks on the front detail.
	Once soldered, the bars should look like this. Carefully file back the lugs of the folds to preserve the half-etch face
	Fold up the etch to match the dimensions of the original item. Fold the U shape around the locating tongue first, then using flat faced pliers, twist the bars flat to the shape of the original. Ensure the running faces are parallel and the crossheads are a smooth sliding fit and not too sloppy.

	Having painted the wheels and inserted them in the chassis, screw on the retaining plate, attach the coupling rods and solder the retaining washers on. Be careful of the plastic slide bar retainer between the 1st and second axle when soldering. On the right-hand side rear axle on later versions, use the lozenge shaped washer pointing to the wheel centre. This prevents the speedo drive moulding catching. Attach the cylinder assembly, insert the crosshead and fit the connecting rod before soldering a washer on the centre axle. Again, test run in this configuration and check quartering.
	The front chassis frame extension pieces are folded up and glued to the body as shown. A slight curve allows a bit more play on the front bogie. Hand paint this to suit.
	The front bogie etch has the bearings soldered in like this. They can go either inside or outside the frame – in this case they are on the inside. Fold up the tabs of the centre pivot box first.
	Then fold up the side attached to the pivot box and solder once checked for straightness on a flat surface.

	Solder a 12BA nut over the pivot hole. Take a piece of 0.5mm thick double-sided PCB to fit along the other side between the bearings. Solder to the side beam from the outside.
	Fold up the side frames and ensure al is square before soldering on the inside of the pivot box. Tin the bearing ear tags before folding back up 180 degrees and soldering to the side frames.
	Finally bend back the bearing ears flat level with the top of the pivot box. Using tin snips or similar cut the bars linking the side frames. A couple of bends back and forth will break off the bars leaving you with a bogie with insulated side frames.
	Temporarily fit a pair of wheels and bend up the guard irons at the front of the bogie.

	After painting, fit the wheels and muffs suitably cut to length. Cut a 12BA bolt to 3mm length and attach the pivot bar. A lock nut inside the pivot box will allow the screw to be secured with just a little play for the pivot beam. Add weight inside the pivot box using liquid lead or similar.
	The final two steps are to undo the front screw of the keeper plate, slip in the pivot bar and re-attach the screw. Lastly fold up the two slide bar braces into little handle shapes and attach with thick super-glue, ensuring that the crossheads are free to move full travel. Soldering may be possible, but will be very tricky.

Once the tender wheels have been turned and the appropriate couplings fitted, you should have a Castle class fit for any 2FS layout.

The front bogie bearing ears are intended as a secure starting point to add a bit more detail, probably built up from plastic rod. Etching these odd shapes would produce odd results, but the ears give you something to hang extra detail on to. Consult prototype photographs and drawings to complete this final element.