

London & North Western Railway
London Midland & Scottish Railway
British Railways

Birmingham, Liverpool and Manchester Set Trains
Non-gangwayed Lavatory Stock

D147 Composite
D321 Brake third

Ten three-coach set trains of 57' high roof lavatory stock were built at Wolverton in 1907 on the capital account for semi-fast services between Birmingham, Liverpool and Manchester. They also worked to destinations as far afield as Rugby, and Llandudno, with the odd trip to Bletchley and on the Harborne Branch. They were rarely seen on the Trent valley line and the rest of the system. Certain trains consisted of two sets in tandem, with the Manchester and Liverpool portions being divided or combined at Crewe.

A typical 1921 diagram was as follows, with two sets working round on alternate days:

	Arrive	Depart
Vauxhall		0120 ECS
Birmingham New Street	0125	0715
Liverpool Lime Street	1038	1210
Llandudno	1500	
Llandudno		1100
Liverpool Lime Street	1509	1910
Birmingham New Street	2150	2210 ECS
Vauxhall	2215	

The ten sets were made up of two D321 brake thirds with a D147 composite sandwiched between them. Originally the composites were first and second class but after the abolition of second class in 1912 the former second class compartments were demoted to third class. The D321 compartments were the same generous 6' 6" as in the seconds and 4" wider than the earlier cove roof London - Rugby sets. The first class compartments were an equally luxurious 7'7". All the carriages were electrically lit by the Stone's double battery system, and were carried on the standard LNWR underframe with 9'0" wheelbase deep frame bogies at 41' centres.

All ten sets stayed in their original formations until the Grouping, and all were repainted in LMS livery and renumbered together except Set 5 which was disbanded in March 1925. From 1922 onwards the Birmingham - Liverpool/Manchester services were worked by four carriage inter-corridor sets. Accordingly, BLM Sets 1-4 were transferred to the Central Wales line thereafter being variously described as Swansea - Shrewsbury, Crewe - Merthyr and Birmingham - Merthyr sets but still numbered 1-4 in the same order. At the same time BLM sets 7-10 were transferred to the Northampton District, but retaining their identities. These latter (together with BLM set 6) received an extra carriage about 1923/4 and were re-designated Manchester - Llandudno sets 20, 23, 22, and 24 in that order. Most of the sets seem to have been disbanded and reduced to loose vehicles around 1930.

Numbering details

The D147 composites were built as numbers 1880-1889 inclusive, being renumbered 3919-3928 in the 1910 renumbering scheme. The first LMS numbers were 8534-8543, and the second LMS series 19522-19531. They were marshalled into BLM sets 8, 6, 5 4, 3, 2, 10, 1, 7, and 9 respectively.

The D321 brake thirds were originally numbered 28, 134, 243, 361, 275, 360, 434, 515, 523, 531, 554, 573, 578, 597, 626, 654, 665, 671, 692, and 724. These were marshalled in pairs in that order in BLM sets 1-10, i.e. 28 and 134 in BLM set 1, 243 and 261 in set 2 and so on. Post-1910 numbering was 6863, 6895, 6944, 6951, 6956, 6988, 7009, 7043, 7048, 7052, 7066, 7074, 7076, 7082, 7092, 7103, 7107, 7109, 7114 and 7127 in the same order. The first LMS numbers were 6891-6910, and the second 25551- 25570.

Dates of repainting into LMS livery:

Set 1 3/25, Set 2 8/26, Set 3 7/25, Set 4 12/33, Set 6 11/23, Set 7 10/26, Set 8 2/27, Set 9 2/27, Set 10 10/26.

D147 was withdrawn between May 1945 and May 1953 (the last two being 19529/30) and D321 between October 1943 and August 1953 (25565 being the last).

Additional comments

These carriages were fitted with Stone's double battery lighting system from new. Carriages operating permanently in fixed sets often had batteries in only one or two vehicles (usually the brakes) with jumper cables between carriages. After 1913, when the Wolverton system became standard on the LNWR, any loose vehicles without batteries from disbanded sets had the Wolverton system fitted. A regulator box is included with the kit so the Wolverton lighting system can be used if desired. In common with other LNWR non-corridor stock these carriages were not fitted with the Westinghouse brakes. They were fitted with Mansell pattern wheels. The LNWR made a change to steel disc wheels in 1914 but it is unlikely that any carriages were refitted.

References:

An Illustrated History of LNWR Coaches (including West Coast Joint Stock), D Jenkinson pp106, 109, 172-3

A Register of the West Coast Joint Stock, R M Casserley, P A Millard

Selected LNWR Carriages A Detailed Commentary, P A Millard

An Illustrated History of LMS Standard Coaching Stock, R Essery, D Jenkinson, p41

Construction notes

Parts list

Body, underframe, vee hanger, bogie and commode handle frets wrapped in paper.

Packet 1	Packet 2	Packet 3	Packet 4
Underframe parts	Bogie castings & fixings	Roof castings	
Regulator, 1 off	Bogie side frame, 4 off	Torpedo vent, 18 off	Set of 16" sprung buffers
Dynamo, 1 off	Bogie end plate, 4 off	Lavatory tank filler, 6 off (2 for D321)	
King post, 2 off	10BA nuts & screws, 2 off	Duck board, 2 off	
Vacuum cylinder, 2 off	12BA nuts & screws, 4 off	Sidelight, 2 off (D321 only)	
		Door tee handles	
Vacuum pipe, 2 off	Interior items	Roof materials	Miscellaneous
Steam pipe, 2 off	0.030" plasticard strip, 1 off	Aluminium roof	0.5mm wire, 3 off
Screw couplings fret, 1 off	0.020" plasticard strip, 1 off	Microstrip, 2 lengths	0.7mm wire, 1 x 6"
	Glazing strip, 1 off		
	Seat moulding, 2 off		

The kit requires 14mm Mansell wheels, bearings, door tee handles, paint and transfers to complete. Please read these instructions before starting to build your model. Examine all the parts and familiarise yourself with their assembly. Remove any moulding flash or etch attachment points and ensure all parts fit correctly. We suggest wet fine emery paper (1200 grit) to clean up flash marks. Carry out a dummy run before assembly. Assembly is best carried out using ordinary solder for etched components or low melt solder for white metal. An epoxy resin such as Araldite and glues like UHU, Multibond or Thixofix can also be used. For small parts use superglue. To obtain the best results a combination of several techniques will be needed.

Most sharp bends are given by a half-etched line, which is always on the inside of the bend. In order to achieve a third layer of rivet detail on some components, dimples are etched into the reverse side of the sheet. Before assembly these should be raised. It is sufficient to press onto a piece of solid card with, for example a slightly blunt dart point; attention is drawn to this procedure by the phrase "raise rivets".

This is the suggested order of assembly but there are many ways of assembling this or any other model. The part numbers quoted are as etched on the frets.

Underframe

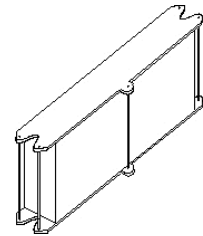
Remove the floor (C1) from the fret and separate it from the full-length stepboards (C4) either side. Raise the rivets on the solebars and fold them to 90°. Open out the bogie centre pilot holes to a clearance fit on the 10BA screws, and those at the ends to 12BA clearance. Do not fold out the vee hangers – these are misdrawn and are replaced later with a separate etch.

Tin the inner faces of the full-length step boards (C4), then fold them through 180°. Supporting the step board in a vice, sweat the two halves together. Fit the step boards to the solebars, leaving 1mm of solebar showing below.

Fit a king post casting to each side of the floor, symmetrical about the centre lines and 35mm apart. Thread lengths of 0.5mm brass wire through the holes and bend to form the trussing. Form the lower step boards (C5, 2 off) as described for (C4) above. Fit the step boards in place as shown in the drawing, using the etched droppers (C6, 8 off).

Battery boxes and underframe fittings

This section starts by assuming you are modelling a carriage fitted with the Stone's electrical system. Carefully scribe a centre line on each battery box (9, 2 off), on what will become its outer face. Fold the sides to 90°, then solder it in place on the base plate (10, 2 off) with the scribed centre line in line with the centre hole. Add the top plate (10, 2 off), and thread 0.5mm brass wire through the holes. Solder a battery box symmetrically inside each king post so there is a gap of 20mm



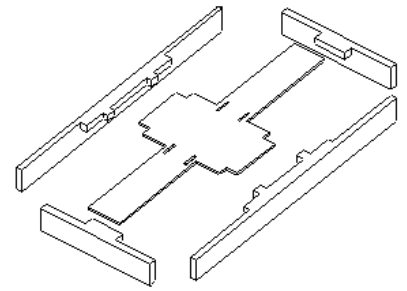
between them. *For a carriage fitted with the Wolverton system,* only one battery box is required, which for D321 goes on what will become the side with the brake compartment to the right. The other side carries the regulator casting, which should be fitted slightly offset to the left, with the angled face facing outwards just below the solebar. The positioning relative to the 1st/3rd class ends is not known for D147.

Position the dynamo 16mm from the adjacent bogie axle centre line and 3mm from the carriage centre line. The casting may require a triangular packing piece to ensure it is vertical and the pulley is slightly lower than the wheel axle. For D147, the dynamo goes under what will become the 3rd class end; for D321, the dynamo goes under the passenger end.

Fold up the vee hangers in the nickel silver frets, then fix the vacuum cylinder casting to the half-etched circle. Drill out the centre hole to suit the long etched lever. Make up the operating levers (the medium-length levers are bent then sweated together, forming a yoke into which the long lever is inserted), then place them into the cylinders. Thread a 0.7mm wire cross shaft through the vee hangers, the operating lever, and the short bogie push rod lever, thus trapping the latter two in place. Fix the units to the floor, so that the cylinder is adjacent to the solebar on each side, and the cross shaft is 45mm from the bogie pivot hole. The bogie push rod lever should be on the carriage centre line.

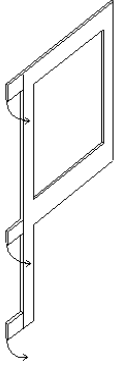
Bogies

Clean off any flash from the bogie side and end castings. Drill out the pilot holes in the etched stretchers to accommodate the 10BA screws, which should now be soldered into place on the underframe. Solder two radius plates into the slots on the top of each stretcher, then solder the end plates in place. Drill out the pre-marked axle centres on the cast side frames to accept your chosen bearings. Solder one side frame to the brass stretcher, fit the wheels (paint them first!), then trap them in place by soldering on the other cast side. For D321, fold up the etched footsteps and fit them to each side of the same end of one bogie – this end will go under the guard's doors.



Body sides

Important: the door outlines have erroneously not been continued on to the lower panels. Using a sharp point, carefully scribe them in place. Alternatively, draw them in after painting, but before final varnishing, although the then presence of the hinges makes this the more difficult option.



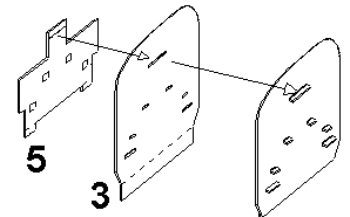
Carefully remove the carriage sides from the fret. Form the tumblehome curve below the waistline to match the ends by forming around a half-inch tube or a suitably profiled piece of wooden skirting board. Taking the etched droplights/hinge strips (8), bend the hinges as shown in the sketch, locate them through the pre-etched holes in the carriage sides and fix in place. Use the pieces with a horizontal bar if you want an open droplight. Add hinge strips (8A) to the van doors on D321.

Although the commode handles are best fitted after painting, now is the time to ensure that the pre-etched holes are opened out sufficiently to take them; there are two holes per handle.

Add the door ventilators, one above each door, including both the guard's and van doors on D321. Also add the brake van sidelights to D321 as shown on the scale drawing if required – they were removed in the 1930s.

Body ends

Remove the external ends (3 and 4) and their corresponding internal ends (5 and 5A) from the fret. Drill out the pilot holes for the handrails and grab rails on each end. Fold up the headstocks on the external ends. Fold parts (5) and (5A) to shape, including the steps and side support wings. Locate each internal end into its corresponding external end and sweat together. Before folding the two end boxes (7) to shape, mark out and drill 12BA clearance holes in the larger rectangle, to match the holes in the underframe. Solder an end box to each internal end. Add the buffer bodies to each end, but leave fitting the springs and heads until painting is completed.



Solder the sides to the ends, tack soldering first then running solder into each corner joint once satisfied with squareness. For D147, end (4) is at the 1st class end; for D321, end (3) is at the brake end of the carriage. Add the handrails and grab rails formed from 0.5mm brass wire. End (3) has two long curved handrails and end (4) two short straight ones, as shown in the drawing. You will need to fabricate the train alarm gear for end (4) from scrap brass for the brackets and 0.5mm for the rods and piping. Also add two lamp irons to each end, slightly inboard of the buffers, as shown in the drawing. Trial fit the underframe to the body, adjusting if required, and solder the 12 BA screws in place on upper faces of each part (7).

Interior

Temporarily fit the body to the underframe for this section. Trim the 0.030" plasticard floor to fit inside the body, and drill holes to clear the bogie screw heads. Using the etched bulkheads (6) to give the profile of the compartment partitions cut the required additional number from the 0.020" plasticard and glue all in place. (You may choose to solder in the brass partitions instead, but this will then require the seats to be fixed to the floor with a gap between them, rather than to the partitions.) Cut the seat mouldings to fit each compartment and again glue in place.

Roof

Cut the roof to the length of the body plus a slight overhang at each end. Trim the corners of the flange to clear the ends. Add the rainstrips from the supplied microstrip.

Mark out the positions of the torpedo vents as shown on the scale drawing, and fit them. The compartment vents are on each door centre line, and 8mm either side of the roof centre line. The lavatory vents are around 5mm to the right hand side of each window, and again 8mm either side of the roof centre line. Fit a lavatory tank filler casting above each lavatory window: in line with the left hand edge of the window, and 4mm either side of the roof centre line. Also add a duckboard to each end (planking transverse). Note that these carriages do not appear to have been fitted with roof end grab rails.

Painting

Paint the body, underframe, roof, interior, and bogies as separate units and fit together on completion.

Liveries

London and North Western Railway

LNWR livery is often referred to as 'plum and spilt milk'. The lower panels and mouldings were a 'carmine lake' colour. Usually the vents were also lake. The upper panels were a shade of white created by the addition of a small amount of blue to the white base colour and the yellowing effect of varnish. The ends were painted chocolate, not lake, and the underframe, running gear and gangways black. Fixed window frame mouldings were usually Indian red and the door and window drop lights varnished natural wood. On the rounds of the raised mouldings a 1/2" gold coloured line edged 1/8" in white was applied. When applied adjacent to a carmine lake panel this white line was both sides of the gold. In contrast, the white line was only on one side where the adjacent panel was white. The gold colour was made from a mixture of lemon and orange. A 1/8" white line was applied to the edges of the doors. The brake van double doors were given a slate waist panel for marking destinations. Roofs were generally painted white but this quickly degenerated to a grey colour in service. The interior should be painted dark red for third class seats and darkish green for first class seats, and wood brown for the compartment divisions and van area.

We suggest the following Precision Paints:

Carriage carmine lake

P379

Carriage 'white'

Lining tan

P380

P381

Insignia was applied in the gold colour used for lining, sans serif style and edged in black. Class designation and other wording were applied to the waist panels of the doors and running numbers were placed towards both ends just above the waist. Transfer crests were applied to the lower panels below the numbers. Monogrammed initials were also used. We recommend HMRS sheet number 16.

West Coast Joint Stock

Paint and lining details were the same as the LNWR. Insignia was shaded green to the left and below and WCJS crests were used in place of LNWR crests. HMRS sheet number 16 is suitable.

London Midland & Scottish Railway

Carriage sides were painted crimson lake, identical to the Midland Railway shade. Ends were painted crimson lake until 1936 (black afterwards) with detail work such as gangways, steps and pipework being black. In 1946 the LMS changed the name to maroon although it is doubtful if the colour actually changed too. Roofs were generally painted in the Midland style of light grey between the rain strips and black between the rain strips and cantrail. From 1933 onwards to the outbreak of WWII, the roof was specified to be a metallic aluminium type finish. The roofs quickly became dirty in service and more often than not were a muddy grey colour. Underframe and running gear should be painted black.

Prior to 1934 all carriages were lined in Midland style. Raised beading was painted black and edged with a 3/8" gold line. These lines were edged each side with a 1/16" vermilion line. All three colours were carried on the beading and not the body panels. In all cases the lining followed the outline of the beading. The end beading was also painted black, but not lined.

From 1934 onwards a simplified lining system was adopted. This consisted of a 1/2" yellow line just below the cantrail, and a similar line above the tops of the windows. Two further 1/2" yellow lines separated by a

1" black line were positioned just below the windows. During WWII lining was discontinued on the few carriages to be repainted. Lining was reintroduced in 1946, with yellow being changed to straw.

We suggest the following Precision Paints:

Crimson lake	P30	Lining gold	P35
Carriage roof grey	P40	Lining yellow	P36
Carriage roof aluminium	P41	Vermilion	P37

Lettering such as LMS etc was applied in serif characters 4" high to the side waist panels, as near to the centre of the carriage as possible. The colour was gold until 1934/5 after which chrome yellow was used. The lettering was shaded in pinkish white to the left blending to dark red/brown below the characters; the shading in turn was shadow shaded to the right and below in black. The class type was marked on the doors in 8" high numbers rendered in gold. The LMS roundel was placed on the lower side panels, near to the centre of the carriage. We suggest the use of HMRS sheet 1 for the early period and sheet 2 for the later period.

British Railways

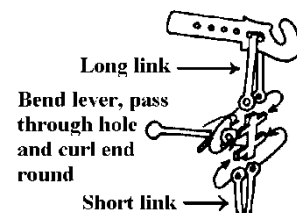
These carriages should have been painted unlined crimson on the sides; ends, underframe and running gear would be black, with a grey roof. Whether any actually lasted long enough to require repainting is doubtful.

We suggest the following Precision Paints:

Carriage crimson red	P116	Roof grey	P131
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Finishing

Add the commode handles to each passenger door, and your choice of etched or turned tee handles. Fix the glazing in place, noting that trimming may be necessary to clear the door handles. Assemble the screw couplings according to the sketch and fit to the headstocks. Also add the vacuum and steam pipes – both go to the right of the coupling hook, in the order hook/steam/vacuum. Fit the buffer heads and their springs.



Finally, assemble the vehicle.

A more recent version of these assembly instructions may be available on the Wizard Models web site: www.wizardmodels.ltd. For further help or information please email: info@wizardmodels.ltd

Wizard Models

Wizard Models stocks a wide range of items for the 4mm scale modeller.

Wizard Models Limited
PO Box 70
Barton upon Humber
DN18 5XY
Tel: 01652 635885

www.wizardmodels.ltd

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