

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

General Service Non-gangwayed Suburban Stock - 50' Cove Roof Carriages

These instructions apply to:

D110 7 compartment first
D182 7 compartment composite
D285 8 compartment third
D336 6 compartment brake third (built as brake seconds)
D338 5 compartment brake third

Prototype information by Philip A Millard with additions by 51L

Manchester Exchange District Sets

Twenty-two of these sets were built between March 1903 and February 1904. With their 9ft width (seating four, five and six-a-side in the firsts, seconds and thirds respectively) and cove roof profile they were very modern handsome vehicles for their time. The first six and the last six sets had some minor detail differences, which means that the kits accurately represent Sets 7 to 16 inclusive.

The history and configuration of these sets is rather complex. To start with, they were made up of five carriages marshalled D338, 2 x D285, D110 and D336 in that order. In 1909 one of the D285s was removed and in most cases the carriage was converted for motor train use. This reduced the sets to four carriages, and they remained in this form until 1927 at least, and probably considerably longer. As a consequence of the removal of one carriage it was thought necessary to revise the seating accommodation in the remainder of the train. The D336 brake seconds had one compartment altered to third class, which meant that they were now brake composites and had to be renumbered accordingly. The D110 all firsts also had one compartment down graded to third class, which meant they also became composites, and were renumbered accordingly. Hardly had this been done before all carriages were renumbered again under the 1910 scheme, which reduced the carriage stock to one number series. A further upheaval resulted from the abolition of second class in 1912; the D336 brake composites (formerly brake seconds) became brake thirds, and the D110 composites (formerly firsts) reverted back to all first once again. Needless to say this all meant another change of number into the appropriate series. This means that modellers must choose the date represented by their models with care!

Broadly similar sets were built at the same time for use in the Birmingham and Liverpool areas, but the formation was not the same and included (true) composites to D182 for Birmingham and D183 for Liverpool in place of the D285. Two more sets, again somewhat different, were provided for the Broad Street - Watford services.

Manchester Exchange Sets Nos. 5, 7 and 22 were disbanded about 1910, the latter two becoming Manchester and Macclesfield Sets 2 and 3. In both cases an additional vehicle was included in the set; this was changed several times over the years but the other carriages stayed together until 1927 at least. The other Manchester Exchange Sets became Inter-District Sets 150-168 in 1919, but for some reason retained the suffix "EX", and presumably remained on their old section. The "EX" was removed in 1927 by which time all 19 sets had been repainted and renumbered into LMS livery but were otherwise unaltered.

The carriage underframes were of bulb-iron section, and were mounted on deep frame 8ft. wheelbase

bogies with Mansell wheels. The lower footboards between the bogies were removed by the LMS in the 1930s, retaining only the short step on the bogie beneath the guard's doors.

Ordinary passenger train workings in the Manchester Exchange District took the sets to Leeds, Huddersfield, Bolton, St Helens, Liverpool and Wigan. At peak times they were often strengthened with additional carriages, while quite a number of workings required two sets to be coupled together to form an eight coach train, especially between Tyldesley and Manchester. They would also be used for weekend excursion traffic, especially from the Manchester area to Blackpool and the North Wales coastal resorts. As an example, a typical day's duty in 1921 was North Eastern District Diagram 77:

	Arrive	Depart	
Wigan		0738	(A)
Manchester Ex.	0840	0910	(B)
Tyldesley	0944	0950	
Earlestown	1103	1135	
Manchester Ex.	1235	1250	
Leeds	1511	1610	(C)
Manchester Ex.	1832	1907	
Patricroft	1928		

- (A) With two additional thirds and parcels van for Exchange.
- (B) Double set.
- (C) With an additional 57ft third.

Full numbering information for each set would occupy many pages. As a typical example Set No.9 was turned out on 22/9/1903 and consisted of:

- Brake second D336 no. 63; to BC 1962 in 1909, BC 6162 on 24/5/11, BT 7799 on 25/11/12.
- First D110 no. 204; to C 1959 in 1909, C 3982 on 24/5/11, F 4699 on 25/11/12.
- Third D285 no. 2172; removed from the set 1909 and converted to Dia. M25 no. 4017.
- Third D285 no. 2157; retained this number until the grouping.
- Brake third D338 no. 1811; to BT 7507 on 24/5/11.
- The four remaining vehicles were renumbered in December 1925 as LMS nos. 7241, 10132, 5551 and 7347 respectively. They became 22566, 10412, 13758 and 22369 under the LMS 1933 renumbering scheme.

A second example is Set 14 turned out on 18/11/03:

- Brake second D336 no. 266; to BC 1241 in 1909, (BC 5951 allocated), BT 7706 on 4/12/11.
- First D110 no. 137; to C 1826 in 1909, C 3901 on 4/12/11, F 4703 on 1/5/13.
- Third D285 no. 1973; retained this number until the grouping.
- Third D285 no. 2228; removed from set 1909 and converted to Dia. M25 no. 4027.
- Brake third D338 no.805; to BT 7155 on 4/12/11.
- The four remaining vehicles were renumbered in August 1927 as LMS nos. 7236, 10136, 5545 and 7313 respectively. They became 22584, 10419, 13786 and 22388 under the L.M.S. 1933 renumbering scheme.

As well those built for set use, there were many "loose" vehicles (including all of D182). All were steam heated and fitted with Stone's double battery lighting system from new. Loose vehicles were fitted with one battery each side. Sets of carriages often had batteries in only one or two vehicles with jumper cables between carriages. Usually it was the brakes that had batteries fitted. After 1913 when the Wolverton single battery lighting system became the LNWR standard it was fitted to any loose battery-less vehicles created from sets. Two battery boxes, a dynamo and a regulator are included in the kit so any lighting system may be modelled. There is no reason to suppose that carriages already fitted with the Stone's system were converted to Wolverton pattern lighting at a later date.

In common with other LNWR non-corridor stock these carriages were not fitted with Westinghouse brakes.

General numbering information for set and loose vehicles is:

Diagram	Number built & when	Final LNWR number range	First LMS numbers	Second LMS numbers	First withdrawal	Last withdrawal
D110	24, 1903-4	4507-4709	10119-42	10403-26	3/1937	Early BR
D182	29, 1904-7	2548-3918	9120-44	17008-16/21-32/34-40	5/1937	3/1958
D285	73, 1903-6	30-2223	5491-5554	13743-802, 13808-11	?	1950s
D336	33, 1903-4	6514-7811	7220-52	22561-93	1/1939	8/1953
D338	82, 1904-7	6862-7804	7290-7363	22365-429, 22441-8	?	12/1959

Many of the D110 all firsts were marked down to all thirds in later LMS days and renumbered to 13419, 13423-5, 13514, 13571-5, 13603, 13619. Under BR, all vehicles generally carried the second LMS number prefixed M, then also suffixed M from 1951.

These cove roof carriages were mostly withdrawn in the immediate post-war period, with odd vehicles surviving to the 1950s and yet others were converted into service stock. As usual, they were somewhat down at heel in their final years and doubtless they saw use on workmen's trains, football excursions and the like.

References

An Illustrated History of LNWR Coaches (including West Coast Joint Stock), D Jenkinson, pp109-116, 174-6

Historic Carriage Drawings Vol 2 LMS and Constituents, D Jenkinson

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

LNWR liveries, E Talbot, P Millard, G Dow, P Davies

British Railway Pre-Nationalisation Coaching Stock Vol.2; OPC; H Longworth

Construction notes

Parts list

Side, end, underframe, vee hanger, roof cradle, vent and commode handle frets wrapped in paper.

Packet 1

Underframe parts

Dynamo, 1 off
Vacuum cylinder, 2 off
King post, 2 off
Vacuum pipe, 2 off
Screw couplings fret, 1 off
Steam pipe, 2 off

Regulator, 1 off
Set of 5 nameplates, 2 off (brakes only)

Packet 2

Bogie castings & fixings

Bogie side frame, 4 off
Bogie end plate, 4 off
10BA nuts & screws, 2 off
12BA nuts & screws, 4 off

Interior items

0.030" plasticard strip, 1 off
0.020" plasticard strip, 1 off
Glazing strip, 1 off
Seat moulding, 3 off (2 in brakes)

Packet 3

Body & roof parts

Torpedo vent, 14 off (16 in D285)
Sidelight, 2 off (brakes only)
Roof light, 2 off (D338 only)
Door tee handles

Roof materials

Aluminium roof
Microstrip, 2 lengths

Packet 4

Set of 16" sprung buffers

Miscellaneous

0.5mm wire, 3 off
0.7mm wire, 1 x 6"
0.9mm wire, 1 off

The kit requires Mansell pattern 14mm carriage wheels, bearings, 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 those etched on the frets.

Underframe

Separate the full length stepboards (C2, 2 off) from the floor (C1). Raise the rivet detail on the solebars and fold up to 90°. Open out the bogie centre pilot holes to a clearance fit on the 10BA screws. 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, then fold them through 180°. Supporting the step board in a vice, sweat the two halves together. Attach the step boards to the solebars, leaving 1mm depth of solebar showing below.

Fit a king post casting to each side of the floor, symmetrical about the centre lines and 31mm apart. Thread lengths of 0.5mm brass wire through the holes and bend to form the trussing. If required, form the lower step boards (C4, 2 off) as described for (C2) above. Fit the step boards in place according to the drawing, using the etched droppers (C5, 8 off). *[The etched droppers are only loosely held in place on the fret, and it is possible that some may have become lost in packing/unpacking. If so, replace with wire.]*

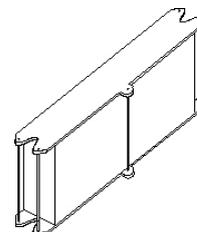
Battery boxes and underframe fittings

Reading the prototype notes above, establish which lighting system

your carriage is to be fitted with. If one battery box is required:

Carefully scribe a centre line on one battery box (unnumbered, 2 off), on what will become its outer face. Fold the sides to 90°, then solder it in place on the base plate (unnumbered, 2 off) with the scribed centre line in line with the centre hole. Add the top plate (unnumbered, 2 off),

and thread 0.5mm brass wire through the holes. Solder the battery box symmetrically inside the king post on one side of the carriage. If two battery boxes are required: Repeat the box assembly as above, and fix them symmetrically inside the king posts so there is a gap of 20mm between them.



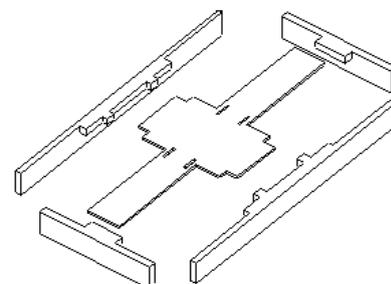
If one or two battery boxes have been fitted, position the dynamo 16mm from the adjacent bogie axle centre line and 3mm from the carriage centre line. The casting may require a triangular packing piece to ensure it is vertical and the pulley is slightly lower than the wheel axle. If using the Wolverton system the regulator box should be placed on the opposite side of the carriage to the battery. Ensure the angled face faces outwards and the box is just below the solebar.

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 40mm from the bogie pivot hole. The bogie push rod lever should be on the carriage centre line.

These carriages carried a vacuum pipe which ran from end to end via the solebar. This is best modelled in three parts, so the body and underframe can be separated. Take the 0.9mm brass wire and make two 90° bends in it, so that the inside faces of the short legs are 200mm apart. Solder the wire underneath the long step board down one side of the underframe. Leave the short legs overlength for now.

Bogies

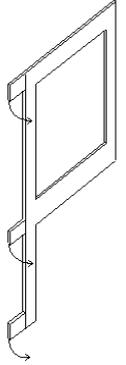
Clean off any flash from the bogie side and end castings. Drill out the pilot holes in the etched stretchers to accommodate the 10BA screws, which should now be soldered into place on the underframe. Solder two radius plates into the slots on the top of each stretcher, then solder the end plates in place. 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 D336 and D338, fold up the etched footsteps (C7) and fit them to each side of the same end of one bogie – this end will go under guard's door. Ignore the footsteps etched as part of the bogie fret.

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.



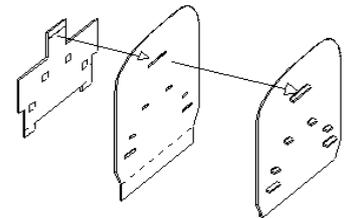
Carefully remove the sides from the fret. The thin strip at the top of each side provides support for the roof cradle – do not remove it! Form the tumblehome curve below the waistline to match the ends by forming around a half-inch tube or a suitably profiled piece of wooden skirting board. Also remove the etched droplights/hinge strips from the centre of the roof cradle. Bend the hinges as shown in the sketch, but do not bend along the half etched line above the window aperture on each droplight. 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. The ledges formed by fitting the droplights and hinges give the position of the roof cradle; fold the top strips 90° inwards on top of these.

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 (18 off), one above each door, including the droplight-less van doors on D338. Also add the brake van sidelights to the rectangular plate in the endmost panel on D336 and D338 as shown on the scale drawing if required – they were removed in the 1930s.

Body ends

Remove the external ends and their corresponding internal ends from the frets. (For D336 and D338 there are two brake ends, one with four glazed windows for the early period and one with two for the later period. A requirement to remove two of the glazed areas was made in 1910, but it is believed that up to 3-4 years were required to complete the work.)



Drill out the pilot holes for the handrails on the ends. Fold up the headstocks on the external ends. On each internal end, mark out the centres of the body fixing holes on the lower flaps to match those on the ends of the carriage floor and drill out to 12BA clearance. Remove the rectangular plate containing three lamp irons and a wide step from one of the internal ends. Fold the internal ends to shape, including the steps, side support wings and train alarm gear lugs. *Note that the lugs may not have survived the etching process, or may break off during bending. If so, replace them with flattened wire.*

Locate each internal end into its external end and sweat together as shown in the sketch. Add the buffer bodies to each end, but leave the springs and heads until painting is completed.

Solder the sides to the ends according to the drawing, tack soldering first then running solder into each corner joint once satisfied with squareness. Do not solder the vacuum pipe to the ends. To the plain end, add a profiled roof end strip and the train alarm gear piping and two short straight handrails from 0.5mm brass wire. To the step end, add a profiled roof end strip, two long curved handrails formed from 0.5mm brass wire, and fold up and add the long central step. For coaches running in sets, you may wish to fabricate electrical jumpers. Add them to both ends of D110 and D285, and to the compartment ends of D336 and D338. Also, for set D336 and D338 carriages, add a set nameplate to each brake end; these go between the outer panels, approximately 2mm above the headstock.

Trial fit the underframe to the body, adjusting if required, and solder the 12 BA screws in place on the upper faces of each internal end.

Interior

Temporarily fit the body to the underframe. Trim the 0.030" plasticard floor to fit inside the body, and drill

holes to clear the bogie screw heads. Using the etched bulkheads 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.

Remove the interior assembly from the body, and separate it from the underframe. Fit the roof cradle to the body, on the side support strips.

Roof

The roof provided is the correct profile for the LNWR cove roof stock and is manufactured from extruded aluminium. Cut the roof exactly to length; it is designed to fit within the ends. Add the rainstrips from the supplied microstrip. Mark out the positions of the torpedo vents and 0.5mm brass roof grab rails as shown on the scale drawing, and fit them. The torpedo vents are positioned in pairs over the centre of each compartment 8mm (2') either side of the carriage centre line. The grab rails are fitted to the step end. Add two roof lights to the brake end of D338 as shown in the box photo, one above each rainstrip towards the passenger compartment side of the double luggage doors.

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.

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

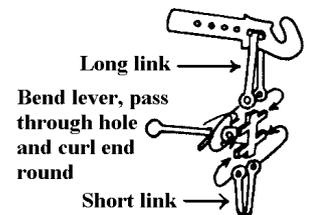
These carriages should have been painted unlined crimson on the sides; ends, underframe and running gear would be black, with a grey roof.

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. Fit the buffer heads and their springs.



Assemble the vehicle. The roof may be glued in place, or secured with small screws from underneath through the roof cradle.

Bend the cast and brass wire vacuum pipes as shown on the scale drawing and trim them so they meet. Do not fix the cast and wire pipes together unless you are certain you will never need to separate the body from the underframe. Add the steam pipes, to the right of the coupling hooks. Patch paint as required.

A more recent version of these assembly instructions may be available on the Wizard Models website. For further help or information please email: andrew@modelsignals.com

Wizard Models

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

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