The London General Omnibus Company K-Type Motor Bus



The B-type, the first successful motor bus designed and built by the London General Omnibus Company (LGOC or just "General"), came into service in 1910. However, as early as 1914 design work for a successor was started, though the war meant little progress was made before 1917 when the end of the war was in prospect and a new start was made. The first example, K1, of the resulting design was available for testing in May 1919, and entered service in August of that year. A second prototype entered service in September. Subsequently a total of nearly 1100 production K-types were licenced between May 1920 and late 1921. Even before the last were delivered the K-type was superseded by the similar but larger S-type in central London, but it survived in large numbers on less busy suburban and country routes until 1930. The last were withdrawn in 1932.

The main change from the B-type was to move the driver forward so that he sat next to the engine rather than behind it. This allowed the lower saloon to be nearly 2ft (600mm) longer, and the rear platform 10in (250mm) wider, all within the permitted maximum length of 23ft (7m). The lower saloon was also made wider, and the sides were vertical all the way down to the floor, except for cutouts required to accommodate the rear wheels. This allowed four transverse rows of two double seats, the only longitudinal seats being two three-seaters over the rear wheels. The upper deck was also extended, to make room for six rows of double seats on each side. The carrying capacity rose dramatically from 34 (16 downstairs and 18 up) for the B-type to 46 (22 down and 24 up).

During their lifetime, most (if not all) K-type buses received new bodies on which the lower saloon sides curved inwards slightly, near floor level, giving a rather more elegant appearance. Several paint schemes were used over their lifetime, though always mainly red with off-white window frames. Early buses had the lowest part of the saloon sides in brown, like the B-types, and also had quite elaborate black lining on the body sides, engine cover and driver's dash board. In the mid-1920s the brown panels were repainted red, the lining on the lower saloon was changed to a simpler form, and the remaining lining removed. Later still all the lining was removed.

There are two K-type buses in working order today: K424, preserved by London Transport and owned by the London Transport Museum and K502, used as farm accommodation until 1968, then restored by Barry Weatherhead and owned by him.

The Model

My model is based on K502, but I have chosen to represent it approximately in its original condition with straight sides and the paint scheme it would have carried in its earliest days. This has probably led to some anachronisms in the advertisements and route indicators, but I hope nothing too glaring.

The main material is 160g/m² card (0.2mm thick), but small use is made of other thicknesses of paper and card for laminating parts to specific thicknesses, and thin glazing material. Parts are provided for a simple lower saloon with opaque windows and entrance, and for a full one with glazed windows and a full, if simple, interior. For the first, print page C1 and omit D1, D2 and D3, for the latter option print D1, D2 and D3 and omit C1. In either case, print all the remaining pages.

On the part sheets symbols are used to indicate cutting, scoring and folding options, as follows:

►	Score on front, mountain fold
\succ	Score on back, valley fold
\sim	Cut slit
×—	Do not cut or score
$\overline{\mathbb{C}}$	Curl the part between the lines, printed side out
C	Curl the part between the lines, printed side in
0.8mm	Laminate on card to the total thickness given
└─_1mm─┘	Laminate two parts on either side of card to the total thickness given
	Cut out internal shape

Note that in a few instances the photographs which follow reflect a different building sequence from that suggested, but I hope that this will not be too confusing.

A. Chassis





Make the right chassis rail by gluing A1 and A2 back-to-back with a card filling to make a total thickness of 1.5mm. Face the front and bottom edges with parts A3 and A4. Do the same for the left-hand rail A6-9 and for the cross beams A11-13, A14-15, A16-17, A18-19 and A20-21. Fit them all on the floor A5 in the positions marked. Note that the middle cross beams A14/15 and A16/17 are not quite vertical, and the markings on A15 and A17 are towards the left-hand side of the chassis. Double the front brace A10 leaving the end tabs free, and fit between the dumb irons at the front of the side rails.

Construct the engine block A59 and flywheel A53-57, and join them using the ring A58. Glue the block to the floor A5. Make up the gearbox A62 and prop shafts A61 and A63, place the front shaft in the holes in the flywheel and gearbox, and glue the gearbox to the cross beams A15 and A17. The gearbox is offset towards the lefthand side of the chassis, but the holes for the shafts should be on the centre line.



Make two front springs by laminating parts A26-33 together, and shaping them in the former. Wrap the narrow strips A23 around to suggest U-clamps. Curl the ends of parts A26 tightly to make a hook. Fit hangers A22 to the chassis dumb irons, and shackles A24 and spacers A25 to each side of the chassis rails where marked. Glue the springs to the hangers and shackles, ensuring that they stand upright.



Prepare the rear springs in the same way, with leaves A42-48 and wraps A37. Make the front hangers from A34-36, noting that they are handed because of the tapering chassis rail. Make the rear hanger from A39-41, but leave off the outer shackle A38 for the moment. Assemble the auxiliary volute spring A49-52. Fit all of these to the chassis.



Glue the rear springs to the hangers A36, volute springs A51 and the inner rear shackles A40. Add the outer shackles A38.



Construct the front axle from A68 and A69 backed with card, and edged with A75 and A77. Fix to the centres of the front springs.



Make the differential and worm gear housing from A64-67 and A74. Roll the axle housing A70, thread it through the differential and fix it centrally. Add bracing pieces A71-73. Make the mounting blocks A69 and glue them to the ends of the axle housing. They should be angled approximately 5° clockwise (as viewed from the right-hand side) of the axis of the worm housing, so that when mounted on the springs the housing is in line with the rest of the drive train.



Fit the rear drive shaft into the front of the worm housing, and glue the mounting blocks A69 to the centre of the rear springs.



The cylindrical exhaust silencer (muffler) A82 and A83 is supported from the middle cross members by straps A78 and A79. The two pipes are very narrow, so are represented by flat strips A80 and A81. The front end of the main pipe A80 is attached to the floor A5 close to the flywheel.



B. Front End



Start by shaping the rounded edges of the interior of the driver's compartment B3 and form an open box with the sides and floor. Apply the outside layer B4 starting with the engine side, then wrapping round tightly and gluing the right-hand side. Laminate the curved top and then the "petals" of the corners aiming for a tight but smooth fit. Complete the underfloor portion with a recess under the slots for the control levers.



Form the engine cover B5 around the formers B1 and B2 - the second copy of B1 is to form and strengthen the rear edge of the narrow offside (right-hand) section of the cover.Assemble B3/4 and B5.

A simpler version with sharp front edges is also provided, to avoid the doubly-curved top corners. For this use parts B3S, B4S and B5S instead of B3-5.



Parts B35 and B36 form underfloor bracing for the steering column beneath the hole cut in the compartment floor. The steering column should rake backwards by about 10° .



Make the pedals B9 and B10 and glue them to the floor in the positions marked. Make a four-layer sandwich for the steering wheel with a rim B31 on either side of the doubled spokes B30. Dish the spokes and secure in position above and below by the centre rings B32, ensuring that the holes for the steering column are lined up and not obstructed by the ends of the spokes. Roll the column B33, fit the wheel to it, and seal the top with B34. Glue the column into its support bracket.



Double the front B16 and back B17 of the radiator, then wrap them with B11, using the former to ensure that the reverse curves at the top are firmly attached. Make up the filler cap from B12-15 and attach. Fit the front number plate B25, then glue the assembly to the front of the engine cover former B1.



Make two hand grips B6/7 and attach to the engine cover. Assemble the fuel tank cover B18, B22 and B23. Decorate it with the fuel filler B19/20, tax disc B21 and maker's plate B24 and then fix it to the back of the engine cover and driver's floor. Make up the driver's seat B38 and backrest B39. Glue the seat to the top of the fuel tank but reserve the backrest for now.



Prepare the handbrake lever B26 and gear stick B28 and roll their mounts B27 and B29 respectively into cylinders. Fix the mounts to the bottom of their levers. Slide the gear stick through the wider slot in the floor and glue the mount to the recess wall beneath, at the spot marked. Reserve the hand brake for the present.

C. Simple lower saloon



Assemble the sides C1, C2, C3 and C4 into an open box.

Assemble the wheel arches C6 and C7 and fit in the cutouts of floor C5. Glue the floor to the tabs on the body ends C3 and C4.

Fold the black parts of the sides C1 and C2 underneath, and laminate to the floor C5.



Thicken parts C9 with card, then glue to the sides of the entrance reveal C8. Form the bottom step around the core C11, then attach the whole to the inside of the rear wall C4.

Fit the ceiling C12 to the top of the walls C1-4, beneath the tabs, and ensure that everything is square.

D. Full lower saloon



Curve the wheel arches D5, fit the ends D6. Attach to the interior body sides D1 and D2.

Laminate the door pillars D8 with card, and glue to the reveal D7. Fit this around the opening in the saloon back wall D4, then cover the inside edge with D9.

Form a box with the walls D1-4, then fit the subfloor D10 on top of the side tabs.



Form the left rear seat cushion D15L, then attach the support D17L using the front rail D16L as a joining strip. Repeat for the right-hand seat.

Fit the saloon floor D11 on top of the subfloor D10, with the rear lip bent down and glued to the back edge. Glue the rear seats to the marks on the saloon sides, rear and floor.

Make the rear transverse seats using the tall seat backs D12 and frames D19 and D20, and cushions D18.

Fit to the marks just forward of the longitudinal seats.



Make the remaining seats using the short seat backs D13 and frames D21 and D22, and the rest of the seat cushions D18. Fit in the marked positions.



Insert the ceiling D14 beneath the top tabs. The large side window openings should give enough access to allow the tabs to be glued firmly.



Line the wheel arches with parts D27 and 28.



Add glazing, if desired, to the outside of the window openings, then add the outer skin of the saloon, D23, D26, ...



... D24 and D25.

E. Platform and Stairs



Bend the stair side piece E1 into a quarter circle between the outer two red uprights printed. Fold the steps E7 concertinafashion, and glue the outer tabs to the stringer at the bottom of E1.

Bend and glue the inner stringer E4 to the inner step tabs, then laminate with E2.

Laminate the outside E4 to E1.



Fold up the underside of the stairs E6 and fit to the stairs E7 and side rails E2 and E4. Make up the conductor's document rack E3 and attach to the back of the top step.



Glue the platform rim interior E18 around the sides and rear of the platform top E15, then add the outside layer E19. Glue the filler E17 to E15 inside the tabs of the rim E19 to form a flat surface on which to fit the platform underside E16.



Form the step E14, then apply E13 to the reverse side. Make four brackets E11, fit them to the step E13, then mount the step on the platform underside E16. Fit the stay E12.



Now assemble the lower deck. Fit the front end assembly B to the front of the chassis A, and then the lower saloon (assembly C or D). Do not attempt to centre the wheel arch over the rear axle - the axle should be slightly forward of the centre of the opening.

Attach the driver's backrest B37 to the front of the saloon.



Glue the platform to the projecting chassis rails. Make and fit the route number stencil E8 and number plate E10. Laminate the platform barrier E26, curve it to match the platform edge and add the legs E27-29 and the joiner E30. Fit to the outer edge of the platform E15 and the rear of the lower saloon. Do not attach the stairs or Stage Carriage plate E9 at this point.

F. Canopies and Guards



Make the front canopy. Start by doubling the rim F7 then glue it slightly inside the edge of the top F8 - it should be flush with the edge of the central cutout. Add the roof interior F6 to hide the rim tabs, then the side brackets F1 and F5, flush at the back of the rim. Double the roof beam sides F2 and F3 with a card filler, cover the lower edge with F4 and glue between the brackets in the position marked on F6. Make up two police lights from F9-13 and position in the front corners. The fold in F13 should be to the rear, and when the canopy is in position the lights should point approximately 10° downwards. Make up the switch box F14, sun visor F15 and route box F16 and position as shown.



Double the rear canopy rim F20 and fix it slightly inside the edge of the canopy roof F18, as for the front canopy. Add the interior F19. Make up and fit the route board illuminator F17.

Double and shape the right front mudguard F33. Make up three angle brackets F34-35, F38-39 and F40-41, and glue F40 to the inside of F33 and F38 to the outside, as marked. Make the driver's step F36-37 and fix it to F39 and F34. Prepare the left front mudguard F42 similarly, though here the front bracket F43-44 is more complex and there is only a single rear bracket F45-46. Double and shape the rear mudguards F21 and F22.



Fit the left front mudguard to the chassis side.

Pass the brake lever B26 through the outer slot in the driver's compartment floor and glue the end of the mounting B27 to the right-hand chassis side. Fit the right front mudguard, the front bracket to the bottom of the dash, and the rear ones to the chassis side.

Fit the rear mudguards to the inside of the rear wheel openings.

Glue the front canopy to the front of the lower saloon ...



... and the rear canopy to the rear.

Form four brackets for the left side lifeguard from F25L-32L. Note that the rear bracket F25L-26L in the kit is a little different from the earlier version shown, as that did not fit correctly around the rear spring.

Shape the slats F21-24 according to the lines shown on the parts sheet, then assemble everything, matching up the markings on the back of the slats with those on the front of the brackets.

Repeat for the right side with parts F21R-32R. Make up the equipment box F23. Do not fit the lifeguards or box to the chassis yet.

G. Upper Deck



Form the inner box from sides G1 and G4, ends G6 and G17 and floor G12.

Prepare six left-hand seats, each made up of parts G18L, G19L and G20L.

Fit the seats to the floor and left-hand side of the upper deck, on the locating marks. The seat backs should be horizontal, not parallel to the sloping floor.



Construct six right-hand seats from parts G18R, G19R and G20R, and fold and glue the advertising board G13.

Fit the seats to the floor and right-hand side. Glue the advertising board to the floor and to the rearmost seat frames G18R and G19R, ensuring that it stands vertical.

Make up the rear panel G16, with destination box G11 and route board G9 and G10, and layer on the outside of G17.

Make up the front panel G5, with destination box G11 and route board G7 and G8, and the left-hand side G2 with its advertisement and route stencil G14. Layer these on the front and side of the box.



Glue the base of the stairs to the platform, lining up the rear with the rear of the platform, and the bottom step with the slightly angled ends of the printed slats. Check and adjust if necessary the fit of the top of the stairs to the upper deck, then glue the deck to the top of the lower saloon and canopies. Glue the tab at the top of the stairs to the right-hand side of the upper deck, and the top stair to the underside of the floor. Ensure that the rear top corner of the platform barrier is inside the stair rail, and glue it there. Make up and fit the Stage Carriage plate E9 to the rear edge of the platform.



Finally layer on the right-hand side G3 with its advertisement and route stencil G15.

H. Wheels



Double the front wheel spokes H4 and cut out the gaps. Edge-glue the rims H2 on each side, then the outer sidewall H3. Add the tread H1 and then the other sidewall H3.

Glue the inner hub H5 and H7 to the centre of the spokes, then add eight ribs H9.

Turn the wheel over and fit the outer hub H6 and H8 and the remaining eight ribs. Repeat for the second front wheel.



Make the rear wheels in the same way, using parts H10-13 and H18-22. Note that the larger end of the spokes H22 rest against the wheel hub H21. Make up brake drums from parts H14-17 and glue to the inside spokes, with the brown side H16 showing through to the outside. Make the axle by rolling H23 or from 2mm diameter wood or wire, pass it through the rear axle housing and fix the wheels to its ends. Note that the wheels are not central in the wheel wells, but offset forward, as in the original.



On a flat surface, pack up the front axle beam until the chassis top is level, then glue the front wheels to the ends of the axle beam. They should lean slightly outwards (positive camber).



Attach the left life guard constructed in section E. The rearmost bracket F25L/F26L is split at the inner top corner so that the upright portion of the lower brace can be slid between the chassis and rear spring to be glued to the chassis where marked. The top of the bracket can then be glued to the underside of the lower saloon. The remaining three brackets are just glued to the chassis and lower saloon in one piece. Fit the equipment box F23 to the chassis and lower saloon in the marked position.



Fit the right-hand lifeguard similarly, but with no equipment box.



If desired, fit platform grab rails. They are narrow and fragile, so may be omitted. In order to allow this, their mounting positions are not marked on the supporting parts. Start with the stair rail E20/23, which are glued back-to-back. Glue the bottom vertically to the inside rail of the staircase as shown, and the top to the top right-hand corner of the upper deck back panel. The intermediate tab may be fixed to the canopy rim for stability.



The body rail E24/25 has two brackets with splayed tabs in its centre section. Fix these to the rear panel of the body, lining up the black and red bands on the lower tabs with the corresponding colours on the panel. Glue the bottom end to the rear of the body side, and the top inside the entrance opening.





Finally place the starting handle A60 on the front of the engine block A59 and also glue to the chassis cross piece A10 where they touch.



All is done.

