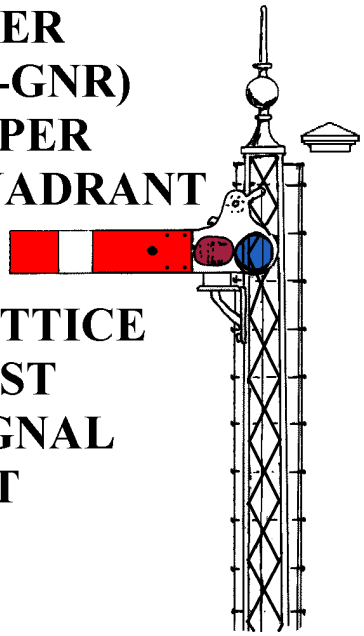
MODEL SIGNAL ENGINEERING
MSE
Part of WIZARD MODELS
PO BOX 70 BARTON upon HUMBER DN18 5XY
01652 635885 www.wizardmodels.co.uk

SCALE 4 mm | CODE S4/KE6

LNER (ex-GNR) UPPER QUADRANT LATTICE POST SIGNAL KIT



Complete kit to build a working (un-motorised) home or distant signal in any height up to 21ft. Some marking out, cutting and shaping of parts is required.

One common type of Great Northern Railway signal consisted of a somersault lower quadrant arm on a lattice post, with a ball and spike finial and round-case lamp. Post-Grouping, the LNER modernised many of these signals by replacing the arm with the upper quadrant Westinghouse type. A square-case lamp was also fitted at the same time. The resulting design was also used for new installations. An alternative finial is supplied to represent the shallow pyramidal pattern used on later LNER signals. Some examples are still in use on Network Rail today.

Parts supplied:
S0012/1 arm etc fret
S0042 lattice post fret
S009/7 ladder fret
SC0010 & 21 finial castings
SC0025 lamp casting
30mm x 1/16" brass tube (arm bearing)
30 x 0.8mm brass rod (arm spindle)
50mm x 26swg nickel silver wire (axles)
2 off 150 x 0.31mm brass wire (2 pieces, operating wire, arm stop/corrugations)
Red, yellow and blue-green glazing
Baseplate

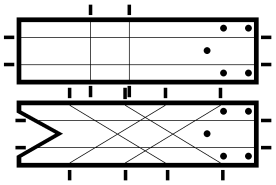
ASSEMBLY INSTRUCTIONS

Ideally, the kit should be built using 50W and 25W (low temperature) soldering irons, 188°, 145° and 70° solders and liquid fluxes, minidrill and slitting disc, various files, pliers, drills etc, and tinsnips and small scissors for cutting out the frets. In these instructions left- and right-hand mean as viewed from the front of the signal. A selection of prototype photographs will help assembly.

Burnish both sides of the frets before removing any parts, and tin the smaller parts before removal. Parts 4, 5a, 6a, 15 & 16 on the S0012/1 fret are not required and may be discarded. Grip the etched parts in smooth pliers when filing off tags to avoid bending them.

The Signal Arm:

Use 188° solder for this section.



Using the half-etched lines as a guide, scribe painting lines on both sides of the chosen arm – home (1) or distant (2). To do the rear side, punch guide pips through from the front marks. Open out the spindle hole in the spectacle plate (3) to 0.80mm (no.68), and the operating wire hole to be a loose fit on the 0.31mm brass wire. For the latter, start with a no.80 drill and work up in size. If you break the etch (which is close to scale size), repair it by soldering on one of the etched washers and filing to shape.

To model the earlier (pre-1936) corrugated arm, deeply scribe the corrugations on to its front, using the horizontal half-etched marks as a guide, and solder two pieces of 0.31mm brass wire onto the rear face at the same distances from the top and bottom edges. Unless your prototype demands it, avoid modelling a corrugated distant arm - the rear is very difficult to paint!

Solder the arm to the half-etched side of (3), ensuring the arm's half-etched bolt heads are on its front face. Remove some of the corrugation wires so the arm will fit to the plate. Solder the arm assembly to the 30 x 0.8mm brass rod spindle. To keep things square, drill a 0.8mm hole in a wood block, insert the spindle then drop the arm on to it face down. When soldering, avoid tilting the arm. Remove the excess front spindle and file it almost flush with the spectacle plate. Leave the excess rear material for now as a painting handle. Joggle the operating wire arm back 0.5mm so the operating wire will clear the spectacle plate.

The Post:

Use 188° solder, for this section, except where stated.

The post as supplied will build into a signal 21ft high. For a shorter post, build it to the full height first, and cut to size afterwards.

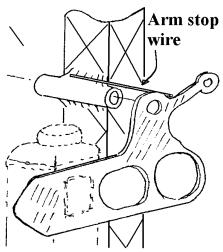
Lightly tin the lattice edges on all four post sides, on both sides of the fret. Cut out the two post halves, and use flat-nosed pliers to correct any distortion caused by cutting out. Accurately fold each half-post to 90°, **with the half etch being on the inside**. Solder along the inside of the bend to fill the gap as much as possible, although complete coverage is not vital at this stage.

Bring the two half-posts together, ensuring the two halves are level. Light pressure clips will help here, or a suitable tapered wooden former such as a chopstick. Make the two long joints along the post, applying light pressure from pliers to help close the gap. Tidy up the joints, and file the top and bottom of the post level. Don't worry about any remaining small gaps along the post corners - these can be filled in before painting with 145° or 70° solders, which have better gap-filling properties than 188° solder.

Now is the time to cut the post to length if required, removing material from the bottom of the post, not the top.

If you intend to use the large rectangular baseplate to mount the signal on the layout, first scribe a longitudinal centre line along it. Solder the post around 15mm from one end of the baseplate, ensuring squareness in all three planes. The post face at the shorter end of the baseplate thus becomes the front of the post.

Attach the 1/16" arm bearing tube to the left-hand side of the post at right angles to the vertical post axis, usually 4mm below the post top. Use the minidrill and slitting disc to trim the tube so it projects just over 1mm on both faces of the post.



Temporarily fit the arm spindle into its bearing, and solder a 0.31mm wire stop in the crook of the bearing/post joint, as shown. This will prevent the arm falling below the horizontal. Use 145° solder for this, to stop the bearing tube unsoldering. Test for free operation of the arm - you may need to file down the top of the spectacle plate or the underside of the wire to achieve this.

The Ladder:

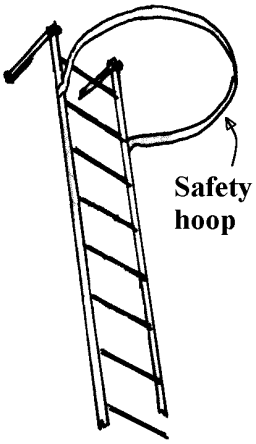
Use 145° solder for this section.

Use the minidrill and slitting disc to form a 5mm long channel in the baseplate, perpendicular to the centre line and 11mm from the post rear face. (If the post has been cut to a shorter height, the channel should be positioned to give a ladder slope around 1 in 12.) If not using the baseplate, solder pieces of scrap wire either side of the post which are long enough to reach the ladder end.

Remove the end rung from the ladder S009/7, then bend the side stiles over at around 105° just above the new top rung, with the half-etched side on the outside of the bend. Cut the

ladder to length, so its bottom end fits in the baseplate channel or can be soldered to the fixing wires, and its top end fits around the post, 1mm from the top. Jiggle the top of the ladder in to suit the post width, then solder the ladder top and bottom; the top bend should be positioned 3mm from the rear of the post.

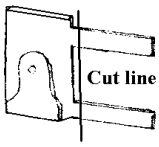
Add a pair of ladder bracing struts (17), about halfway up the post. Solder them to the ladder and post, joggling them to account for the width difference. The ladder end joints should be on the outside of the stiles, and never exactly level with a rung.



Form the safety hoop from strip (14). Wrap it round a 9/32" or 7mm drill; the natural spring of the brass will open it to the correct 8mm diameter. Bend the end tags to the ladder width and solder them to the outside of the ladder stiles, typically 4mm below the arm bearing. (Note that not all signals were fitted with this feature.) Remove any excess tag or strut length and tidy up.

The Balance Weight and Post Fittings:

Use 188° solder for this section, except where stated.



Sweat the two balance weight levers (5) together. Add weights (6) either side to increase the thickness as desired. Open out the axle hole to no.76 (0.50mm), and the two operating wire holes to no.78 (0.40mm). Fold up the bracket (7), as shown, with the half-etched lines on the inside of the bends. Cut off the two side straps as shown.

Insert the straightened nickel silver bearing wire, trapping the balance lever in the bracket so the weight is to the right of the bracket. Oil the lever bearing, then solder (145°) the wire at the bracket hole front and rear faces. Remove excess wire and tidy up the joints.

Solder (145°) the bracket to the front or right-hand side of the post. The bearing hole should be 20mm (5ft) above the baseplate/ground level, unless the signal is in a public area, when it should be 16mm (4ft) below the arm centre line.

Consider how the signal box wire would have approached the signal. Solder (188°) a crank (9) to the front of the bracket (8), using a nickel silver wire axle, so that when the bracket is soldered to the front or right-hand side of the post as appropriate, a horizontal pull on the lower lever will translate into a downwards pull on the other lever. Use one of the etched brass washers to space the crank off the bracket. There is no need to make the crank work, unless it is to form part of the eventual operating mechanism. Some signals had a pulley wheel (10) instead of a crank, but this does not appear to have been very common. [For a working crank/pulley, solder (188°) the axle into the bracket, add a brass washer, then the crank or pulley, a paper washer, then solder (145°) a second brass washer on top.] Finally, solder (145°) the bracket to the front or right-hand side of the post, so the lowest crank hole is just above baseplate/ground level, and the bolt-heads face outwards and are symmetrical about the post. Use pliers as a heat sink to stop the baseplate/post joint melting.

Fold up lamp bracket (11), with the half-etched line on the inside. Solder triangle (12) into the half-etched lines inside the bend; one is longer than the other to match the triangle sides. Solder the bracket to the left-hand side of the post, so its top surface is 6mm below the arm bearing centre line, and the shortest side of the triangle is against the post.

Add the track circuit plate (13) if needed (not on distant signals). Fill in the horizontal pair of half-etched holes, and centre it 52mm (13ft) above the baseplate/ground level.

The Lamp and Finial:

Use 70° solder for this section.

Select the appropriate finial:

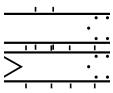
ex-GNR signals, early LNER installations - ball and spike as shown on post top in the heading drawing;
later LNER installations - flat pyramidal finial.

Remove any casting sprue and mould lines from the lamp and finial. Solder the lamp to the bracket, so that in side view, the lamp body is in line with the post, and from the front, the lens falls behind the left-hand arm spectacle. Solder the finial to the post top.

Painting:

Degrease the post and arm assemblies by washing in detergent water and leaving to dry. Spray overall with white car primer, mounting the arm in its bearing to avoid painting the spindle and inside of the bearing tube. Detail paint as follows (but check with photographs as there is a lot of prototype variation):

Black (some parts pale grey from later BR days onwards): – bottom 16mm of post including the crank bracket assembly; ladder; balance weight assembly; lamp; arm bearing; a band on the post 4mm deep above and below the track circuit plate; arm spectacle plate including the V-shape on its reverse; arm rear band/chevron; front chevron on a distant arm.


Full size arm painting template

Red or Yellow: front and edges of the arm except the home's white band or distant's black chevron.

Silver: lamp lenses front and rear.

Glaze the spectacles; use red (home) or yellow (distant) in the left-hand aperture, and blue-green in the right-hand one. The easiest method is to cut a rectangle approximately to size so the whole of the aperture is covered, fix it in place using MSE's *GSA* adhesive or gloss varnish, and then trim the edges when set. Coat the front of the glazing with gloss varnish to give a better glass effect.

Fixing the Arm to the Post:

Use 145° solder for this section.

Ensure the spindle moves freely in its bearing – clean off any paint that might have crept in. Remove any excess spindle length with the slitting disc, but leave enough spindle protruding through the bearing to solder the back blinder on. Open out the hole in the back-blinder (18) to no.66 (0.80mm). Place an oiled paper washer over the spindle end, then solder on the back-blinder, with its reinforcing rib to the rear. Adjust its position so it just clears the lamp rear lens when the arm is horizontal, and push it sufficiently far on to the spindle to remove any fore and aft spindle motion. Wash off any surplus flux, then prime and paint black or pale grey as detailed above.

The Operating Wire:

Blacken the 0.31mm operating wire, by either priming and painting black, using a permanent marker pen, or (preferably) a proprietary metal blackening solution. Make a small hook in the top of the wire. Measure the distance between the arm hole (arm horizontal) and the outer balance lever hole (lever around 30° below the horizontal). With the short end of the hook facing away from you, bend the bottom of the wire 90° to the rear at the measured distance, then trim the bent portion to 2mm in length. Put the hook in the arm hole so the wire is to the rear, then pass the bottom bend through the balance lever hole from the rear, forming a hook to retain it. It may be necessary to joggle the wire to give clearance for it to pass behind the spectacle plate.

The signal may now be installed on the layout and connected to your chosen means of operation.