

## LMS (ex-CR/ GSR) UPPER QUADRANT

## LATTICE POST SIGNAL KIT



**Complete kit to build a working (un-motorised) home or distant signal in any height up to 27ft. Some marking out, cutting and shaping of parts is required.**

The typical Caledonian or Glasgow & South Western Railway signal consisted of a lower quadrant arm on a lattice post, with a ball and spike finial and round-case lamp, all supplied by Stevens & Co. Post-Grouping, the LMS modernised many of these signals by replacing the arm with the upper quadrant Westinghouse type. A D-shaped case Adlake lamp was also fitted at the same time. An alternative finial is supplied to represent the open ball and spike pattern used on later GSWR signals, and by a simple modification to the finial, the kit is also suitable for modernised Furness Railway signals. Some examples may still be in use on Network Rail today.

### **Parts supplied:**

S012/1 arm etc fret  
S7/02/2 lattice post & detail fret  
S09/5 ladder fret  
SC013 & 15 finial castings  
SC011 lamp casting  
30mm x 2mm brass tube (arm bearing)  
30 x 1.0mm brass rod (arm spindle)  
30 x 0.9mm brass rod (balance weight axle)  
30mm x 22swg nickel silver wire (crank axle)  
200 and 3 off 50 x 0.45mm brass wire (operating wire, arm stop/corrugations)  
Red, yellow and blue-green glazing  
Baseplate

### **ASSEMBLY INSTRUCTIONS**

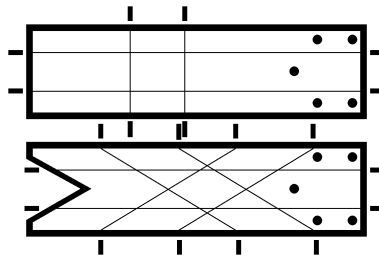
Ideally, the kit should be built using 50W and 25W (low temperature) soldering irons, 188°, 145° and 70° solders and liquid fluxes, minidrill and slitting disc, various files, pliers, drills etc, and tinsnips and small scissors for cutting out the frets. In these instructions left- and right-hand mean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

Burnish both sides of the frets before removing parts, and tin small parts before removal. Parts 4, 5a, 6a, 15 & 16 on the S012/1 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.

Open out the spindle hole in the spectacle plate (3) to no.61 (1.0mm). 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.

To model the earlier (prior to 1936) corrugated pattern of arm, deeply scribe the corrugations on to the front of the arm, using the horizontal half-etched marks as a guide, and solder two pieces of 0.45mm 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!

Punch out the five bolt heads in the chosen arm, then solder it 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 1.0mm brass rod spindle. To keep things square, drill a 1.0mm 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 1mm 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 27ft 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, but don't bother filing off the remains of the tags - being staggered, they help in locating the post halves when soldering. 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**. Use bending bars if you have access to them. Solder along the inside of the bend to fill the gap as much as possible, although complete coverage is not vital at this stage.

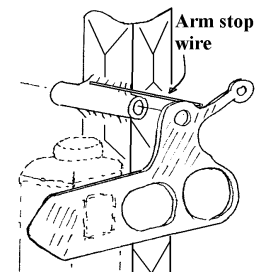


Bring the two half-posts together, and slip on the jig to hold them in place, ensuring the two halves are level. Solder the two long joints along the post, applying light pressure from pliers to help close the gap. When done, remove the locating jig and discard. Tidy up the joints, and file the top and 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 25mm from one end of the baseplate, ensuring squareness in all planes.

Attach the 2mm arm bearing tube to the left-hand side of the post at right angles to the vertical post axis. The bearing's position below the post top seems to be typically 10.5mm but does vary, so check with photographs of your chosen prototype. Use the minidrill and slitting disc to trim the bearing so it projects 1.5mm on both faces of the post.



Temporarily fit the arm spindle into its bearing, and solder a 0.45mm wire stop in the crook of the bearing/post joint, as shown.

This prevents 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.

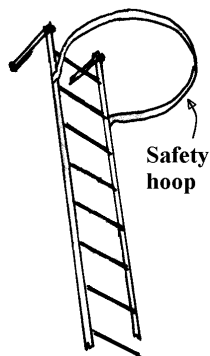
## The Ladder:

Use 145° solder for this section.

Use the minidrill and slitting disc to form a 10mm long channel in the baseplate, perpendicular to the centre line and 26mm 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 8.) 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 S09/5, 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, 5mm 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 5mm from the rear of the post.

Add pairs of ladder bracing struts (17). Solder them to the ladder and post, joggling them to account for the width difference. Check their height and number with photographs. The ladder end joints should be on the outside of the stiles, and never exactly level with a rung.

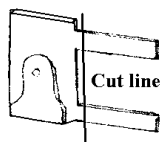


Form the safety hoop from strip (14). Wrap it round a 15/32" or 12mm drill; the natural spring of the brass will open it to the correct 14mm diameter. Bend the end tags to the ladder width and solder them to the outside of the ladder stiles, typically 7mm below

the arm bearing centre line. Remove any excess tag or strut length and tidy up.

## The Balance Weight and Post Fittings:

Use 188° solder for the start of this section.



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.65 (0.90mm), and the two operating wire holes to no.77 (0.45mm). 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.

Now switch to 145° solder.

Insert the 0.9mm brass bearing wire, trapping the balance lever in the bracket such that the weight is to the right of the bracket. Oil the lever bearing, then solder the wire at the bracket hole front and rear faces. Remove excess wire and tidy up the joints.

Solder the bracket to the front of the post (or to the right hand side for a Furness signal). The bearing hole should be 35mm (5ft) above the baseplate/ground level, unless the signal is in a

public area, when it should be 28mm (4ft) below the arm centre line.

Solder a pulley wheel (10) to the front of the bracket (8), using a nickel silver wire axle. Use one of the etched brass washers to space the wheel off the bracket. [For a moving pulley, solder (188°) the axle into the bracket, add a brass washer, then the pulley, a paper washer, then solder (145°) a second brass washer on top.] Finally, solder the bracket to the front or left-hand side of the post, depending on the direction from which the signal box operating wire would have approached. The height should be such that the bottom of the pulley will more or less be in the undergrowth around the signal base. 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 (188°) 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 9.5mm 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 91mm (13ft) above the baseplate/ground level.

## The Lamp and Fial:

Use 70° solder for this section.

Select the appropriate fial:

Caledonian - ball and spike as shown on post top in the heading drawing;  
G&SWR - either fial;  
Furness - as for Caledonian, but remove the top moulded ring.

Remove any casting sprue and mould lines from the lamp and fial. 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 fial to the post top.

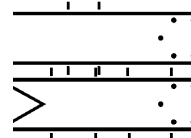
## Painting:

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. It is probable that some Scottish signal posts were painted black overall, but it is difficult to distinguish paint from grime in photographs!

Detail paint as follows (but check with photographs as there is a lot of prototype variation):

**Black (some parts pale grey in later BR days):** – bottom 18mm of post including the bracket assembly; ladder; balance weight assembly; lamp; arm bearing; a band on the post 7mm 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.

**Red or Yellow:** front and edges of the arm except the home's white band or distant's black chevron. If the primer has filled your scribed guide lines, here is a full-size template for marking out again:



**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.61 (1.0mm). 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. If the blade is too high to cover the lens, cut off the right-hand half, and solder (188°) it to the bottom of the left-hand half, thus increasing the depth. Once correctly in position, solder (145°) the back blinder to the spindle. Wash off any surplus flux, then prime and paint black or pale grey as detailed above.

## The Operating Wire:

Blacken the 0.45mm 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 0.45mm brass 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 3mm 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.