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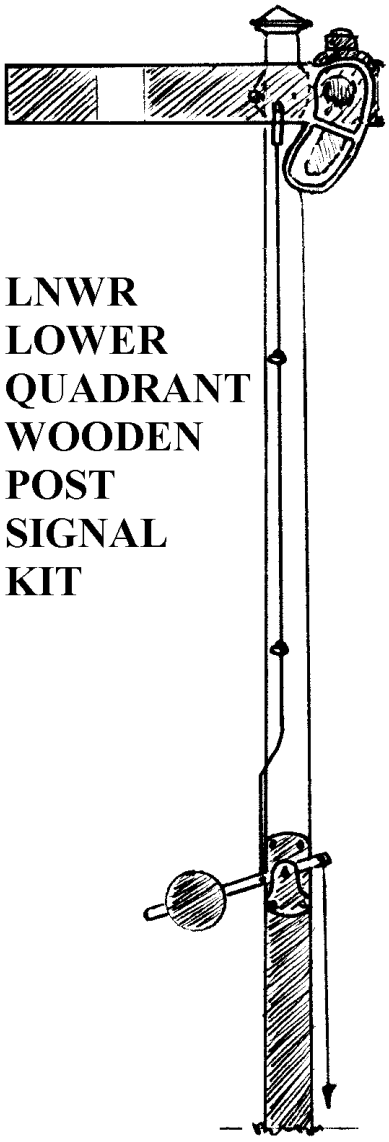
SCALE	CODE	PRICE
7 mm	S7/KM6	£16.00



LNWR LOWER QUADRANT WOODEN POST SIGNAL KIT

Complete kit to build a working (un-motorised) home or distant signal in any height up to 25ft. Some marking out, cutting and shaping of parts is required.

This kit represents the corrugated steel arm signal used by the London & North Western Railway from 1883 onwards, through the LMS period and into BR days. Signals of this type were still in use at least until 1975, and probably later still. The ladder can be placed at the rear (for signals installed 1883-1901) or at the front of the post.

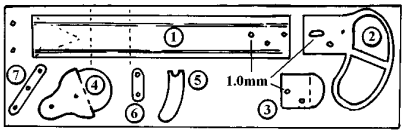
Parts supplied:
S7/04 arm etc fret
S06 wooden post casting
S7/09 ladder fret
SC010 post cap casting
SC030 lamp casting
SC041 balance lever & bracket casting
SC042/1 balance weight castings (2)
30 x 2mm brass tube (arm bearing & collar)
30 x 1.0mm brass rod (arm spindle)
30 x 0.9mm brass rod (balance weight axle)
200 and 3 off 50 x 0.45mm brass wire (operating rod & guides, arm corrugations & bolts, ladder hinge & strut pins)
50 x 0.7mm brass wire (lamp bracket & post cap pins, back blinder spindle)
40cm x 28swg brass wire (ladder rungs)
10 x 1.2mm brass rod (post base peg)
Red, yellow and blue-green glazing
Baseplate

ASSEMBLY INSTRUCTIONS

The test kit was 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. 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 6 and 7 on the drawing below are not required. Grip the etched parts in smooth pliers when filing off tags to avoid bending them. Left- and right-hand mean as viewed from the front of the signal.

The Signal Arm:



Before removing any parts from the fret, and if required for your chosen signal, score the home stripe onto the arm (1) using the marks on the fret as a guide. To do the rear stripe, use a scriber to punch guide pips through from the front marks. Also, solder (188°) two lengths of 0.45mm brass wire onto the rear of the arm to represent the corrugations, using the holes in the fret as a guide. If modelling a distant signal, cut the characteristic V-shaped notch in the end of arm; the apex is 4mm from the arm end. Open out the spindle holes indicated above to 1.0mm (no.61).

Use spectacle plate (2) as a template for marking and cutting out the glazing: blue-green for the bottom spectacle; red for the top spectacle of all signals prior to 1929 and post-1929 homes (i.e. any signal with a red arm); and yellow for post-1929 distants.

Remove sufficient (around 6mm) of the corrugation wires so the arm fits on to the half-etched part of motion plate (3). Place the arm face down on a balsa block, and add the motion plate, also face down. Align the spindle holes using the 1.0mm rod (push it a little way into the balsa) and align the lower holes with an oiled wire axle or the point of a needle (or anything else that won't take solder). Solder (145°) all three components together. Place the spectacle plate face down on top of this assembly, and solder (145°) together. Remove any excess spindle length at the front of the arm, but leave the rear overlong to act as a painting handle. The two small holes in line with the spindle may be filled with 0.45mm brass wire, to represent fixing bolts.

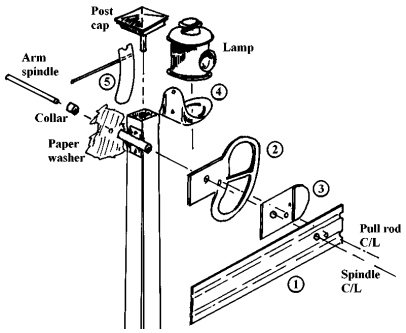
The Post and its Fittings:

Warning: being cast in whitemetal, the post is easily melted or distorted. Handle it carefully, and ensure you have picked up the low-temperature (70°) iron before making any joints!

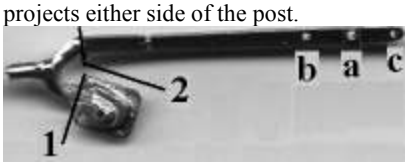
Wooden posts usually came in one of a range of standard heights, chosen to give adequate sighting, as shown in the first column of the table below. The height given is the height of the arm centre-line above rail level, so the post cutting length given in the second column includes an allowance of 7mm at the top and bottom of the post. Non-standard cutting heights can thus be calculated from the table - don't forget to make allowance for any signal not mounted on the ground. Note that a platform starter is typically 15ft high.

Height (ft/ins)	Post cutting length (mm)	Post to ladder distance (mm)
15.0	119.0	17.0
17.6	136.5	18.5
20.0	154.0	20.0
22.6	171.5	21.5
25.0	189.0	23.0

Having chosen your post height, cut off the top 7mm of the post, then cut it to the length shown in the second column of the table, removing the excess from the bottom end of the post - the cast-on balance lever bracket is not required. Remove any flash and mould lines, and file off the lamp bracket, any remains of the balance lever bracket, and the bearing tube, but not its backing plate. The post face with the backing plate now becomes the left-hand face. Finally, square the post ends. Always try to file along the length of the post rather than across it, so any file marks look like timber grain. Straighten the post using gentle finger pressure if it has become distorted.



Solder (70°) the bearing tube to the centre of the cast backing plate (i.e. the tube centreline is 7mm below the post top). Ensure at least 5mm of tube projects either side of the post.



Remove the casting sprue from the balance lever parts by making two cuts with a piercing saw or slitting disc as shown above. Tidy up the cuts and any mould lines with files, and file flat the rear face of the bracket.

Open out axle hole (a) with a 0.9mm drill, then use broaches if necessary to make it a good clearance fit on the 0.9mm brass rod. Treat the holes in the bracket similarly. Open out pull rod hole (b) to 0.5mm, and signal box wire hole (c) to suit your operating wire. Solder (70°) the two weight halves together, then solder (70°) the resulting weight to the arm, leaving around 2mm of arm projecting through the weight. Wrap a piece of paper around the bottom and sides of the arm, place it in the bracket with the weight to the left, then pass the 0.9mm brass rod axle through the holes in the bracket and arm. Solder it (145°) to the front and rear of the bracket, leaving the excess axle projecting from the rear.

Drill 0.9mm right through the front and rear faces of the post. The hole should be on the vertical centreline and 28mm (4ft) from the base, unless the signal is in a public area, when it should be 28mm (4ft) below the arm centreline. Push the balance lever axle through the hole from the front of the post, and solder (70°) the bracket to the post.
Remove the paper and cut off the surplus axle.

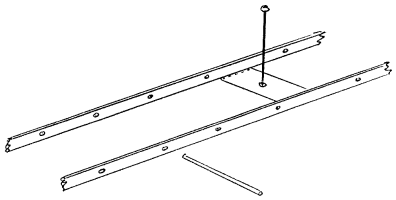
Use 0.45mm brass wire to form at least two U-shaped operating rod guides, around 3mm long by 1mm wide. These should be glued into matching holes on the front of the post, as shown in the heading drawing. Alternatively, loco handrail knobs may be used.

Open out the holes in the lamp bracket (4) to 0.70mm (no.70). Fold the bracket at 90° with the half-etched lines on the inside of the bend, then fold the sides round the circular base. Solder in (145°) two 0.7mm brass wire pins. Drill corresponding holes in the right- hand side of the post, the top one being 4.5mm from the post top. Glue the bracket to the post, and when set, glue the lamp to the bracket. Use the slitting disc to trim back both sides of the arm bearing tube so that it just projects in front of the lamp's front and rear lenses. Do not discard the surplus tube - it is used later. Glue the post cap to the top of the post, strengthening the joint with a 0.7mm brass wire peg.

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 (70°) the post around 30mm from one end of the baseplate, ensuring squareness in all three planes. Drill the post and baseplate and use a 1.2mm brass rod peg to strengthen the joint. If you are mounting the ladder at the front of the post, then the greater length of the baseplate will be to the front of the signal.

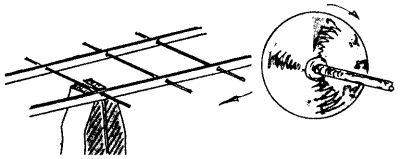
The Ladder:

Start with 188° solder for this section. To avoid mistakes, build the ladder to its full length, and cut it to size at the fitting stage. The jig incorporated in the ladder fret helps to keep the ladder aligned whilst the rungs are being soldered in place. Before removing the ladder and jig from the fret, clear the rung holes to suit the 28swg brass wire supplied. A no.78 drill will suffice, or preferably a five-sided cutting broach. The holes are deliberately etched undersize to prevent failure in production and to give a fine fit to the wire. Also drill a 0.50mm (no.76) hole in each of the curved portion tips, and a corresponding hole through the sides of the post, 1.5mm above the top of the bearing bracket. This will form a hinge, so that the ladder is movable during painting, and fitting the arm and back blinder.



Fold up the two side stiles with the half-etched lines on the inside, and pin the whole assembly to a balsa block, using the holes in the five jig spacers.

Lightly tin the outer edges of the ladder. Straighten some brass wire between finger and thumb, tin it, then cut pieces to length, just over the width of the ladder. Thread them through the holes, two or three at a time, and solder them in place from the outside. Repeat the process at the other end of the assembly, and so on until the middle is reached. It is most important to work from alternate ends as work proceeds, so that the heat from the soldering iron is dissipated along the ladder's length, eliminating any tendency to twist.



Remove the ladder and jig from the balsa block, and tidy up the rung ends using a minidrill and slitting disc. Hold the rungs in pliers as shown to avoid damage. The vibration from the drill is most useful, as it will shake apart any poorly soldered joints! Finally, cut the jig free using a piercing saw or a craft knife on a firm hardwood surface. The slitting disc may be used, but take great care not to damage any rungs. Do not discard the strips in the middle of the jig, as these are used later.

Use the minidrill and slitting disc to form a 10mm long channel in the baseplate, perpendicular to the centre line. The distance from the post depends on the post height - see the last column of the height table. If not using the baseplate, solder pieces of scrap wire either side of the post which are long enough to reach the ladder end. For non-standard post heights, take the post cutting length in millimetres, divide by 12, add 7, and the result is the distance of the ladder foot from the rear of the post.

Slightly widen the U of the ladder top curve to match the ladder inclination, and joggle out the sides to clear the post cap. Place the ladder around the post, and pass a 0.45mm brass wire axle through the previously drilled holes. Solder (145°) the axle to the ladder sides, working quickly to avoid melting any whitemetal. Be careful with the flux, so there is no danger of the ladder becoming soldered to the post. The ladder should now hinge freely about the top of the post.

Carefully measure and cut the ladder to length, so its foot fits in the baseplate channel. Tack solder (145°) the ladder to the baseplate or the fixing wires. Use the strips from the centre of the ladder fret to make bracing struts. 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. Place the holed end at the opposite face of the post to the ladder, then solder (145°) the strip to the ladder. Drill 0.50mm (no.76) through the hole and into the post in preparation for fixing pins. Cut off surplus strut and tidy up. Unsolder the ladder from the baseplate so that in the following sections, it may be moved out of the way as required, but take care not to bend it or the bracing struts.

Painting and Glazing:

Degrease the post and arm assemblies by washing in detergent water and leaving to dry. Put a drop of oil on the balance lever axle, then spray overall with white car primer, mounting the arm in its bearing to avoid painting the inside of the bearing tube.

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

Post etc: For a pre-1923 signal, paint all ironwork and the post below the top of the balance lever bracket bauxite. Post-1923, replace bauxite with black, except that the ladder below the level of black on the post is often painted white. Don't forget a dash of silver on the lamp lenses.

Arms: Pre-1929, all arms were red on the front face and edges and white on the rear, with a white stripe on the front, and a black stripe on the rear. (If the primer has filled in your scribed guide lines, the stripe is 6mm wide and 10.5mm from the outer end.) After 1929, this arrangement continued for home arms, but the front face and edges of distant arms were painted yellow, with a black chevron both front and rear.

Spectacle & Motion Plates: These were painted bauxite prior to 1923, after which they were painted black. Fix the previously cut glazing to the rear of the spectacle plate, using MSE's *GSA* adhesive or gloss varnish.

Fixing the Arm to the Post:

Clean off any paint from the arm spindle and the inside of the bearing, then insert the spindle into the bearing. Remove any excess spindle length with the slitting disc, leaving around 2mm protruding at the rear. Tin (145°) the end of the spare 2mm diameter tube, and cut off a collar around 2mm long. Place a paper washer on the spindle, and solder (145°) the collar on to the spindle, checking for reasonably free motion of the arm (it will be a little tight due to the washer). Use masking tape to secure the arm in the horizontal position.

Solder (188°) a length of 0.7mm brass wire to back blinder (5) as shown above. Secure the signal upside down in the vice, and solder (145°) the wire to the bottom of the collar. Adjust the angle so that the blinder just clears the lamp's rear lens, and covers it when the arm is moved downwards. You may need to adjust the blinder/wire angle to achieve complete coverage. Prime the back blinder assembly and paint it bauxite or black before removing the paper washer.

The Operating Rod:

Prime and paint (bauxite or black) the long 0.45mm brass wire. Make a small hook in the top, and check it fits freely in the arm, inserting it from the rear. Unhook the rod from the arm, and pass the plain end down through the rodding guides. Rehook it to the arm, then bend it to the left as shown in the heading drawing. With the arm horizontal and the balance lever at the bottom of its travel, bend the rod 90° to the front, such that it passes through the left-hand hole in the lever. You will need to remove any excess rod to do this, leaving around 3-4mm to form a hook to retain the rod in the lever. Make any fine adjustment in the position of the arm by gently altering the rod bends.

Finally, solder (145°) the ladder to the baseplate, and pin and glue the bracing strut/post joins. Tidy up the paintwork.

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