MODEL SIGNAL ENGINEERING

SM1 14-LEVER SIGNAL FRAME KIT

Parts checklist
Etched brass frets (2, but one is in 4 parts)
Cast brass lever (14)
Lever spring (14 + 1 spare)
Top-hat brass bushes (2)
1/8" brass rod (8") - axle
1/16" brass rod (6") - catch handle pins
0.9mm brass rod (3 x 12") - catch rods

BACKGROUND NOTES

The kit is designed for soldered construction, with varying parts of the structure requiring differing heat reserves. For the catch handles and catch blocks, a 40W iron is quite sufficient, but for the chassis of the frame, it will be found that a 75W iron or a torch will give the best results for the joint around the two end plates, due to their thickness. It is suggested that 188° solder is used with a suitable spirit flux. Wash off after each session of work otherwise you may build up verdigris on the job. This is not harmful but will ruin your subsequent paint job if ignored. For some stages, a Resistance Soldering Unit will be easier to use if you have access to one.

The long 1/8" diameter axle which retains all the levers is best located within the frame with a couple of split pins or wire retainers through holes drilled in the outer ends of the axle, outboard of the bushes. A 0.45mm hole with a 26swg wire is adequate and provides for later removal or modification of levers (particularly repainting), should that become necessary.

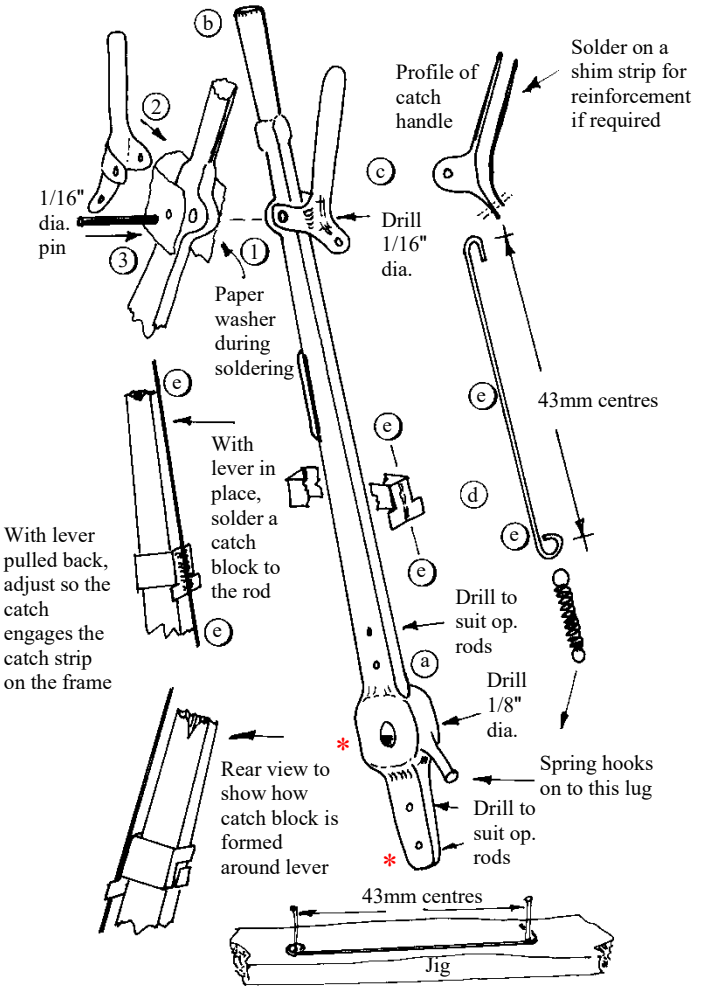
The drive to the signals and points can be by rod or wire in tube. It has been found useful to mount the frame on a sub-base and take short drive rods to the base edge, which are afterwards connected to either an interlocking frame or direct to the baseboard linkage. Whatever connections are used, ensure that they are positive, by the use of set screws etc., so that there is no loss of motion. Electrical operation and interlocking can be achieved with microswitches activated by rods taken from the spare holes on the bottom of the levers.

For simplicity, the "front" of the frame is that which has the lettering on the front plate. However, levers in this position are referred to as "reversed". The "back" of the frame is that which has the catch handles facing what would be the signal box window. Levers in this position are referred to as "normal".

1. PREPARATION OF PARTS

A) **Levers**

a) Remove the casting sprues as indicated in red on the sketch across, smooth off any casting marks and straighten each lever if slightly bent. Finish off the 1/8" clearance hole at the lever boss, to suit the 1/8" axle supplied. The remaining holes at the bottom of the lever should be opened out to suit your operating rods, with the top hole being opened to 1/16" for the catch handle pin.



b) Tin the lever tops so that you get a polished steel effect when the rest of the lever is painted. Also tin the small, raised flange on the lever front where the number plates will later be fixed.

c) Prepare the catch handles - tin the outer area around the holes to facilitate soldering the catch handle pins. If the frame is to receive "heavy" treatment in use, it is a good idea to reinforce the handles with a strip of shim or scrap etch soldered in the area shown in the sketch. You may wish to tin the whole of the handle part to give the same polished steel effect as the lever top.

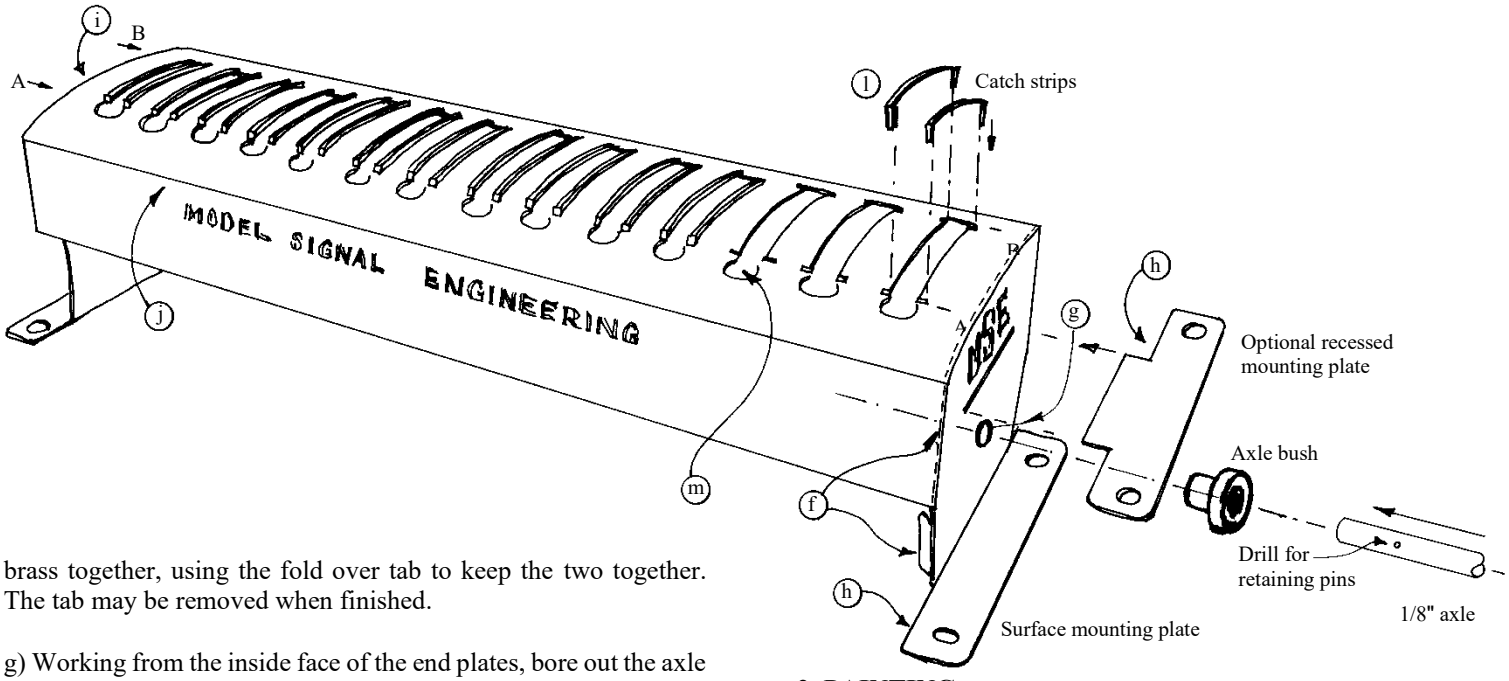
d) Prepare all the catch blocks and form 14 catch rods from the 0.9mm wire with a loop at one end for the spring and a hook at the other end for the handle. 43mm centres will give a firm tension on the spring. A jig made from two nails in a piece of wood will ensure they are all the same; form the loop, place it over one nail then make the hook by bending against the second nail.

e) The areas marked e-e in the sketch end up being soldered together, so they might as well be tinned now.

B) Frame

Before cutting the frets, burnish both sides with a fibreglass brush. All the components can now be removed with tinsnips, working in from the outside of the fret.

f) Fold up the end plates with the *MSE* logo on the outside (the half-etched lines go on the **outside** of the bends). Note that the end plates are handed, with the vertical edges matching the front and back plates of the slotted lever plate. Sweat the two thicknesses of



brass together, using the fold over tab to keep the two together. The tab may be removed when finished.

g) Working from the inside face of the end plates, bore out the axle rod holes to 3/16" to accept the top-hat bushes. Solder the bushes into the end plates, with the rim of the bush on the outside, i.e. the side with the logo. Ensure the bushes are a good fit on the 1/8" diameter axle.

h) If the frame is to be recessed into the layout baseboard, add the subsidiary mounting plates (the two flat plates with two holes). The tabs fit into the slots just below the logo on the end plates. Solder these in with a good fillet. If you have chosen recessed mounting, remove the surface mounting plates at the bottom of the end plates. (Note that both sets of plates are shown on the box label photo for test building/demonstration purposes.)

i) With the MODEL SIGNAL ENGINEERING inscription on the outside/face down, roll the slotted lever plate to the radius of the end tops, using bending rollers if you have them. If no rollers are handy, use a thick tea towel on a hard surface with a rolling pin or a broom handle to do the forming. Don't roll the front or back plate portions of this etch, and do not anneal it.

j) Fold the front and back plates to the profile of the ends, such that the half-etched lines are on the outside of the bends, and all of the half-etch ends up on the vertical portions of the plate. Tin the underside edges and the inside of the folds.

k) Tabs are provided to tack solder the frame together before making the final joints. If you prefer, you can remove the tabs and make good butt joints instead. Solder the endplates to the underside of the lever plate, with the *MSE* logos facing outward. You may need to file just a little off the top tab to locate the arc onto the endplate. After tacking one, insert the 1/8" axle into the bearings to help align the other plate. When everything is square, run a good fillet of solder around all the joints, but only on the inside of the frame. A soldering torch is helpful at this stage to prevent heat loss and to localise the melting.

l) Bend up all the etched catch strips to match the radius of the frame top, noting that the edge of the fret is two of the strips! Drop the end tabs into the slots, tack solder them from the inside, then run solder along the slot edge to fix the strips in place. Polish the tops of the strips and make a sharp, square edge along all 14 slots with a triangular file along lines A-A and B-B. This provides a good register for the catch blocks later on.

m) Open out the front of each slot so the top of each lever will pass through from below during assembly. (This step has become necessary due to an improvement in lever design.)

2. PAINTING

Clean off any stray solder visible on any surface which will be visible after assembly. To remove any residual soldering flux, immerse all the prepared parts in detergent water, as hot as possible. Scrub, rinse off and leave to dry. Lightly oil the inside of the bushes. In order to retain the bright tinning on the lever tops and the catch handles, and the polished catch strips, paint them over with Humbrol Maskol, which can be sprayed over and peeled off afterwards.

Spray all the prepared components with your usual brass primer. When dry, paint the frame in black matt or satin finish. The whole of the levers showing above the top of the frame should be painted to suit their designated function, as should the catch handles and catch blocks. Distant signal levers are usually at the outer ends of the frame and are yellow. Sequentially, home and starting signals in order are next, in red. Points are black and locking levers are blue. Crossing gate levers are brown. Ground signals are red also. You can paint the lever below the frame similarly, if you wish. The half-etched numbers of the number plates should be filled in with black paint. Finally, remove all masking, and polish the number plates, lever tops, catch handles and catch strips.

3. ASSEMBLY

Polish the 1/8" lever axle. You may wish to make spacers from 1/8" internal diameter tube to go between each lever. With the frame on its side, select the first lever, pass it through its slot from below, top first, then pass the axle through the end plate and the lever boss to hold it in place. Repeat for the other 13 levers, finally passing the axle through the other end plate. Add the axle retaining pins if you are using these.

Add the spring, catch rod, catch block and handle to the first lever and secure them in place as shown in the sketch on the first page. Test the lever for smooth operation, and positive locking against the catch strips at either end of its travel. If satisfied, add the number plate to the front of the lever. Repeat for the other 13 levers. If you are adding two or more frames together, please note that higher numbered plates are not available. In this case, it is best to add the number plates with the plain side showing, and use transfers for the numbers so they all look the same.

The completed frame may now be installed on the layout and connected up to its points and signals.

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