# Converting BLI USRA Mikados to CNJ M3s & M3as Mikados

The price of a brass (OMI) CNJ Mikado is frequently in the $800 - $1200 range – even when they can be found - and this would seem to justify the work involved in modifying a BLI USRA Mikado (picture to right) which can be picked up on auction sites for $120 to $200 even with DCC and a sound chip. Some detailing parts are also required as shown, but this still only takes the price up to about $300-350.


The approach of this modification is to give the impression of an M3s or M3as and the photos show that this is achieved without attention to minute detail. One main compromise is with check valves, which have been simulated with inverted stanchions where simulated at all. Others compromises are described at the end.

The following were used: (slight variations of the feedwater pump are required for M3as & M3s).

| Description | | Manufacturer | Number | Approx. $ |
|---|---|---|---|---|
| Boiler check valve vertical x2 | | Cal-Scale | CV-265 | 2x 4.70 |
| Elesco Feedwater Heater System | | Cal-Scale | 190-2003 | 16.50 |
| *M3s, or …M3as* | Feedwater Heater Pump HD Elesco | Bowser - Cary | 13-163 | 5.30 |
| | Early Elesco Feedwater Pump | Bowser - Cary | 13-129 | 4.40 |
| Air Pump (Unpainted Brass Casting) -- 8-1/2" Westinghouse Cross Compound x2 | | Precision Scale | 3092 | 2x 5.00 |
| Sander Valves (Unpainted Brass Castings;pkg(2) | | Cal-Scale | SA-286 | 5.50 |
| Washout plugs - small | | Precision Scale | 48213 | 4.00 |
| Boiler Steps (brass) x2 | | Precision Scale | 3301 | 2x 4.00 |
| Delta Trailing Truck - Black | | Bachmann | H838X-00F01-B | 8.40 |
| Decals – Large Steam | | Raritan Bay Hobbies | CNJ-29 | 8.98 |
| Straight brass wire – various diameters | | | | ? |
| Brass handrail stanchions (boat & rail) | | | | ? |
| Fine brass metal eyebolts (single & double leg) | | | | ? |
| USRA Long Tender | | Bachmann | 89831 | 27.00 |
| | | | **TOTAL** | $107.48 |

Other sources of most of these parts are available – Cal-scale and PSC carry varieties of most – and plastic alternatives to these brass parts can also be found. Decals can also be sourced elsewhere – including dry-rub, although these last are discontinued.

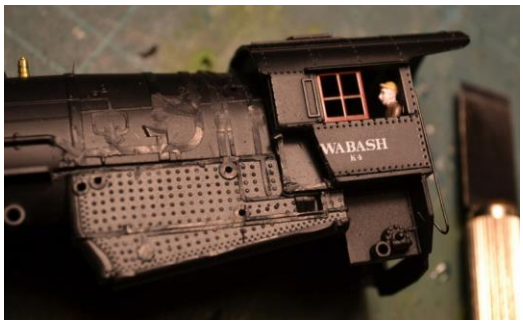
Including the unpriced wire etc.., the total cost comes in at $300-350. About half to a third of the price of the brass models, and the end product includes DCC and sound!

COMMENTS on suitability of parts

| Description | | Comment |
|---|---|---|
| Boiler check valve vertical | | fine |
| Elesco Feedwater Heater System | | fairly good, but even when modified, pipe connections are in the wrong place. |
| *Either* | Feedwater Heater Pump HD Elesco | fine |
| *….or* | Early Elesco Feedwater Pump | fine |
| Air Pump (Unpainted Brass Casting) -- 8-1/2" Westinghouse Cross Compound x2 | | fine |
| Sander Valves (Unpainted Brass Castings;pkg(2) | | wrong – but look OK |
| Washout plugs - small | | fine |
| Boiler Steps (brass) x2 | | fine |
| Delta Trailing Truck - Black | | too short if not modified |
| Decals – Large Steam | | fine |
| USRA Long Tender | | acceptable, but apart from its length & shape, almost everything is wrong (see below) |

## Body Modifications

The main body modification required is the addition of a Wooton firebox. The stages involved are as follows:




Firstly, all the snap-on removable parts were taken off, then the running board above the firebox was removed with pliers and a flat-ended hobby knife. Other details were also flattened and a careful cut was made into the cab.

A similar treatment was given to the rest of the boiler, removing surface detail that was not wanted. This is a matter of taste – some details can be retained, but his makes it hard to get an even finish for adjacent parts – or the boiler can be left largely featureless with everything: pipework, boiler bands etc.. needing to be added fresh. In both cases, it is necessary to file after cutting, and then fill with green/white putty and finally sand with sanding sticks (purchased or home-made).

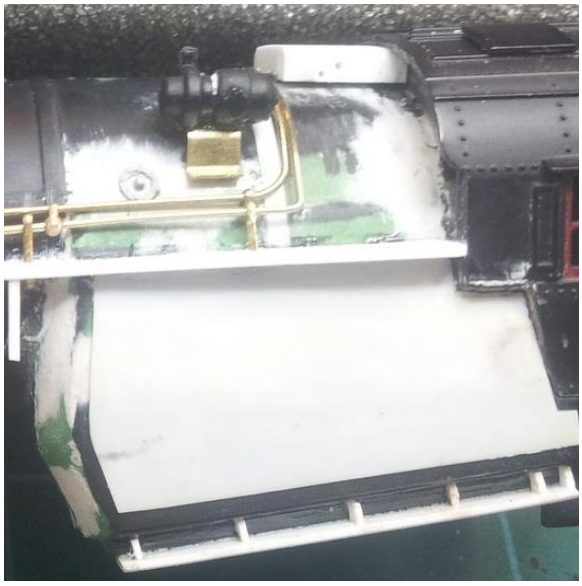

Meanwhile, back to the firebox, a sheet of black plastic-card was cut to the desired shape and glued to the firebox side with polystyrene cement – to fill some of the gaps underneath.


Layers of plastic-card where then added to build up the Wooten firebox shape as shown right. This required

splitting the shapes into two – a largely flat, bottom half and a chamfered top half. The top half was filed to give a rough approximation to a smooth curve.


Green putty and White putty were then used to fill the gaps and give a smooth surface and this was finished with a thin sheet of plastic-card glued over the top. For this use superglue and ensure that there are no air-gaps. Other details such as boiler bands may also be added in plastic-card but use a MEK solvent for this.

## Plastic Card Details



Further detailing around the cab/boiler area was also carried out with plastic card as shown right. Ash pans were added using superglue, as was a new running board and a safety-valve turret cover. The turret cover was pre-drilled, using a hand-held pin vice, to take the pipework (wire).

A plastic generator was attached to the boiler side on a piece of pre-cut and bent brass sheet – again with superglue.

The result is reasonably robust and certainly as strong as many plastic models as supplied.

The crude running board is not evident once painted.

## Pumps, Pipes and 'Valves' (M3as shown)

The next step was to add the Feedwater and air pumps and some of the more involved pipe/wire work.

Holes were drilled in the existing running board with a powered mini-drill to take the pumps and they were attached with superglue (as were their mounts in the case of the air pumps).

Most holes are drilled, however, by hand with a pin vise and the appropriately sized drill bit. The picture also shows split pins being used to hold wire and – above the RH air pump - a three hole brass handrail stanchion, with the end cut off, used to represent a set of valves and joints. The wire is bent and placed and rebent and replaced until it finally fits through holes and to the desired position. It is finally held with superglue applied to the minimum number of places. Superglue is applied with cocktail sticks to ensure that only just enough is used.

## Elesco Feedwater Heater, Check Valve and Cooling Coils (M3as shown)

Unfortunately I have no photos of the heater during assembly and mounting. The steps were as follows:

The rear pipework connections were cut off the body of the Feedwater heater and repositioned (rotated) as shown. These were then soldered on as were the ends. Note that this requires a really hot soldering iron.

A slot was cut in the top of the smokebox to take the Feedwater heater using a razor saw (laterally) and drilled with an electric mini drill to make the ends of the slot. This results in a rectangular hole which disappears when the heater is placed in it.

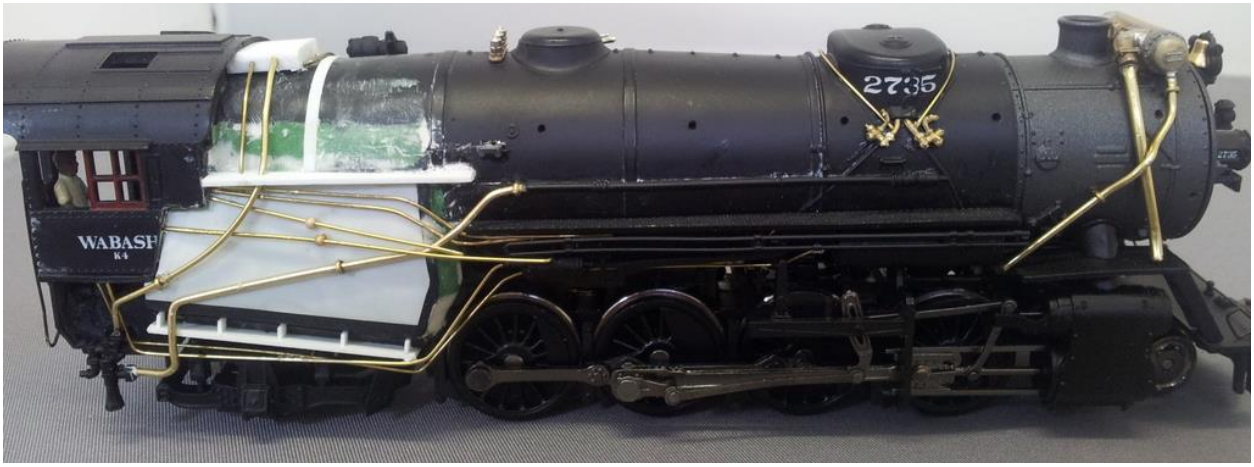
The rather thick brass wire was carefully bent as required, positioned with eyebolts, and superglued in position. This needs to be taken to the full lengths as required and connected at both ends.


This larger picture of the finished LH side also shows the Cal-scale boiler check valve – the join to a piece of brass wire of the same diameter is hidden by an eyebolt and glued; Another eyebolt holds the end in position. The sander valves above it have been cut about and attached to the sand dome. Please also note the remaining white putty on the boiler after filling and sanding.

The cooling coils were scratch built from brass bar and wire and soldered together; a very rough jig was used for this. The brass bar extends up and is bent back and glued under the running board. In the picture above it can be seen that the wire is then extended to connect with the water pumps.

## The Right Hand Side (M3as)

The right-hand side was treated in a similar fashion although it was decided not to remove the boiler check valve on the M3as. As much as possible of the original was re-used on the M3as.

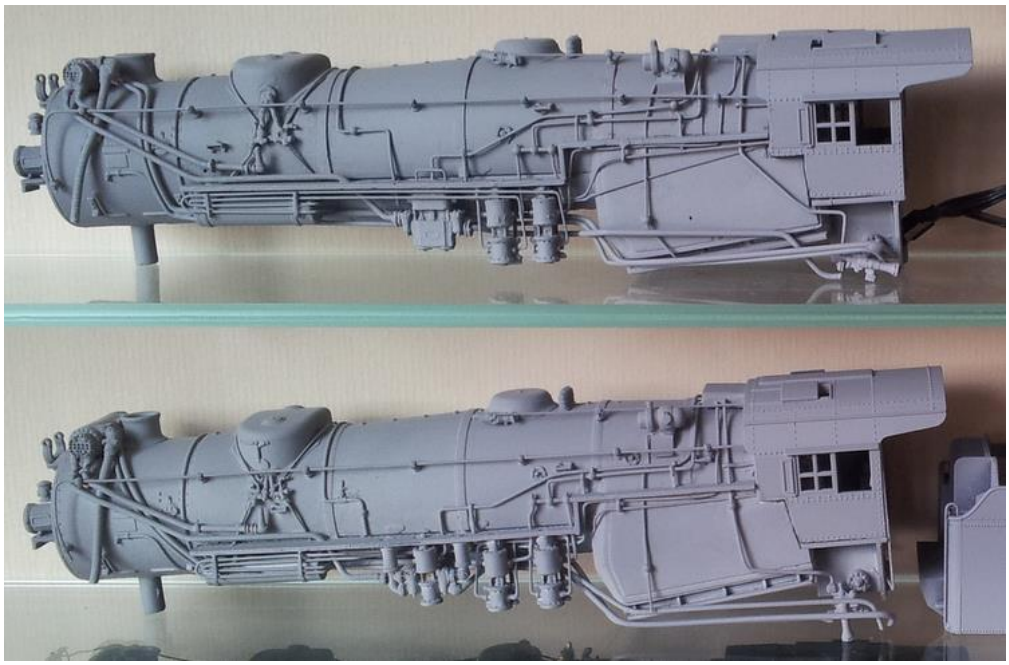



## Primed

Decals were carefully removed and the body was washed in a sonic bath for about ten minutes and then dried thoroughly. Both paint and body were warmed to around 70 F for painting. A spray can of automobile primer was used rather than an airbrush, with several passes. These photos show the differences between the M3s and M3as pipework! The M3s had all the details removed and then added back, the M3as has as many details as possible kept – the end results had a similar appearance.

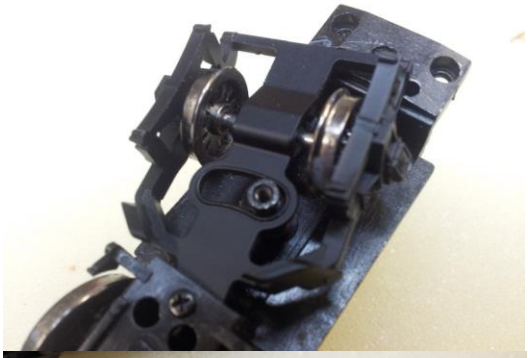
**M3s**

**M3as**

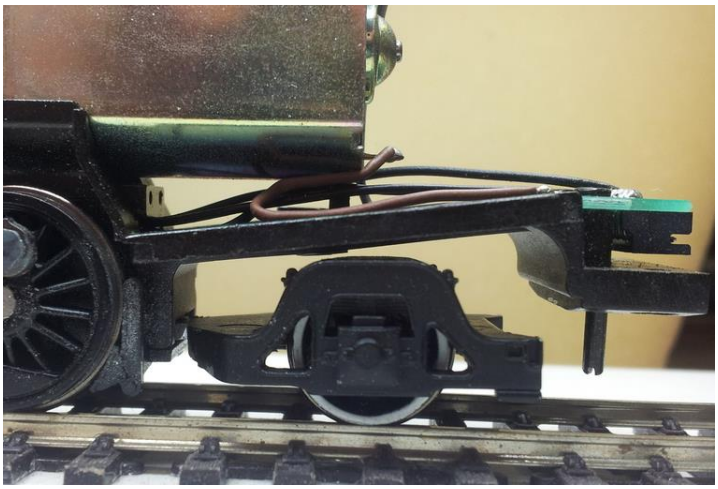


## Trailing Trucks

The prototypes had delta trailing trucks – with spoked wheels earlier and, possibly, smooth wheels after the war (WWII). Bachmann delta trailing trucks (with smooth wheels) were used – these are about the right size but are too short. To fit one onto the USRA frame, the hole was drilled out with a rotary narrow file cone on a mini-drill, and the sides were taken back a little as well (R-centre).



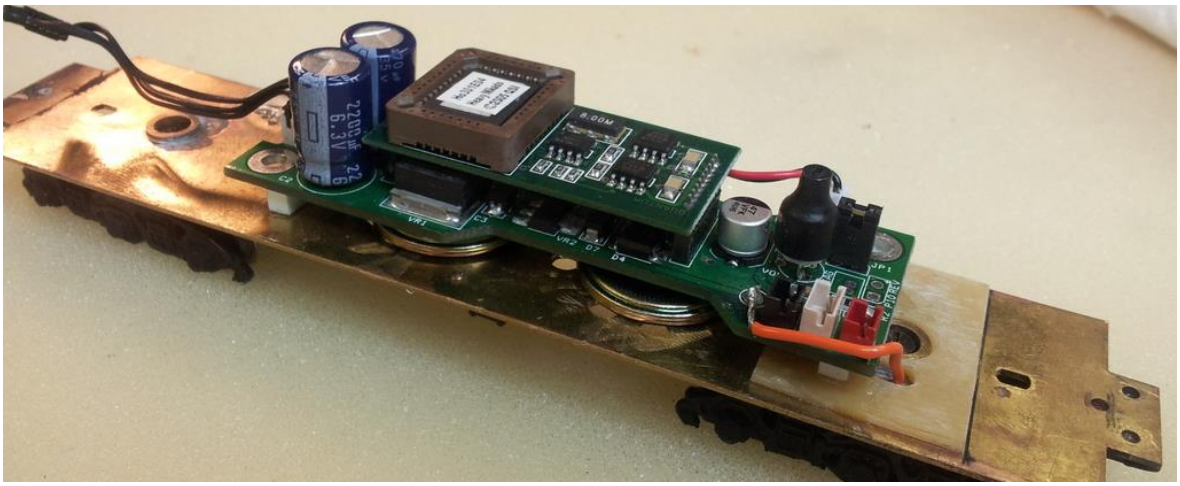
After the original truck was removed, the mounting rod was removed with a mini-drill as shown (R-below) and the new truck was fitted to the same mount. The picture below shows how this is really too short. No attempt was made to solve this on this occasion.

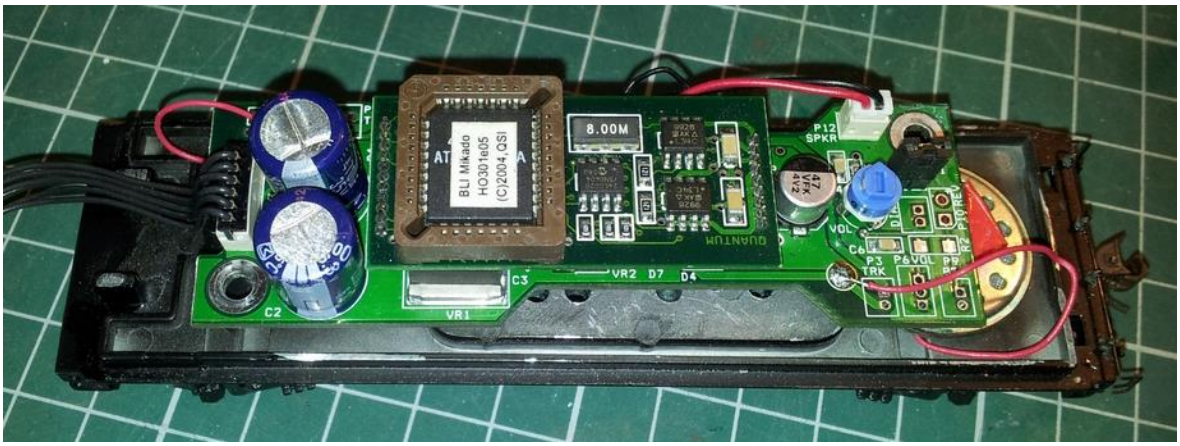




## Tenders

Each tender will have its own problems. A large brass tender obtained off an auction site and a Bachman USRA Long tender were adapted for these two models. In both cases the electrical pickups need to be worked out and connected to the BLI Sound chip boards, and holes need to be drilled in the base to let the sound out! Take care of the potential for shorting – the boards can short to the speakers if in contact and the tender to loco connector  is best replaced with a plastic version (scratchbuilt).

The insides of these two tenders with the sound chips in position are shown over the page. In the case of the Bachmann tender, the base of the coal bunker had to be removed to make way for the sound chip components. The hole was effectively covered by the plastic coal load. The fit was still extremely tight and the sound as a result was a little muffled.






## The Result

This photo shows the converted M3as in front of an OMI brass model of the same locomotive. I believe the effect of the much cheaper conversion is very similar. I hope you agree.

## What is wrong with the Conversion?

There are still a number of features that are less than perfect and it is only fair to acknowledge them:

1. The Wooten firebox is a little short
2. There are only two cab roof lights – should have been three
3. The cab back is open – it should have been closed
4. The delta trailing truck is too short
5. The trucks on the Bachmann USRA long tender (used on the M3s) are the wrong type
6. The ladder on the Bachman USRA long tender is on the wrong side.

For me these compromises didn't spoil the models, but points 2-6 could all be remedied with a little extra work if you think it is worth it.

Steve Hales
January 2016