Clinic notes *- Fitting a DCC decoder into an Athearn Blue-box locomotive*

It is really a simple task to fit a DCC decoder in an Athearn Blue-box locomotive and everyone who has done it says an idiot can accomplish it with ease. Well they are correct because I managed it quite easily.

Let us start by removing the bodyshell from the chassis. For those who have not done this before, we need to ease the shell over the 4 lugs on the cast frame. Once done put the bodyshell to one side but keep it handy to store parts you take off the motor for safekeeping.

Ideally it is recommended that whilst undertaking this DCC conversion you clean and lubricate all the gears and bearings on the power trucks. Today however, we are not going to do that but I suggest you do this at a later date to improve the loco performance.

Our next task is to remove the contact strip above the motor, which connects the motor to the angled contact on each of the trucks. Discard this contact strip, as it is no longer needed. Now we must remove the trucks from the chassis and to do this we will prise off the tunnel like cover over the worm gear. Use a small screwdriver for this by easing it down one side of the tunnel before lifting gently - it should come off quite easily!
Place this cover in the loco bodyshell. Now remove the worm and universal coupling taking care not to lose the end bearings. These parts should also go into the bodyshell for refitting later. Carry out the same task on the other truck and store parts.

We come now to the motor itself – take hold either side of the motor and rock it side to side at the same time pulling upwards to remove it from the cast frame. If it is securely fixed and you are worried about damage then use a blunt object to push on each of the nylon plugs underneath the loco fuel tank to release the motor. Keep hold of the motor and be careful you don't push too vigorously and send it crashing to the floor. Sometimes these plugs become distorted during this process but don't worry, as there are replacements in the decoder pack.

The next stage is one where extra care must be taken not to lose vital parts. First we need to remove the brass contact strips at both the top and bottom of the motor and we should ensure if we possibly can we start this process at the opposite end to where the motor brushes are located. This way the brass contact strip can be held down until the clip at the other end is eased over the ridge. If not then the strip should be lifted up at the motor brush end but make sure you do this slowly until the tension holding down the spring is gently released. Take it from one who knows these brushes and springs can be propelled into infinity so easily. In fact our kitchen has never been swept so many times in such a short time only to find no sign of the offending part – which has never been seen again!
Some people may wish only to remove the top contact strip first and immediately fit the new contact strip (with the orange wire affixed) before attempting the one on the bottom of the motor. (See the notes below which refer to the decoder installation).

Oh yes! At this stage it might be worth shortening the angled contact strip on each of the trucks. If this is done I have found that the trucks pivot with less resistance when the new spade connectors are fixed to the contact strip. In addition the headlight contact unit can be removed from the chassis frame leaving just the riveted portion in situ, attached to the frame.

The decoder pack (Digitrax DH123AT) contains replacement lugs and screws for remounting the motor, replacement brass strips (with wires attached) for top and bottom of the motor as well as the multi-wired loom with its spade connectors and of course the decoder.
For our activities we will also need a small piece of electrical tape and some small heat shrink covering which is not included in the pack. This can be provided for your use.

Now take the cast frame and see the smooth shiny area in the fuel tank well - this is where the lower brass strip on the motor made electrical contact with the frame.
For DCC operation the motor has to be isolated from the frame and so we need to place a piece of electrical insulation tape over this area making sure we do not obstruct the holes for the motor mounting plugs.

To begin the decoder installation the motor needs to have the new brass contact strips fitted so be very careful here not to lose any parts. In fact you need to reverse the process you used when taking the old

contact strips off the motor – i.e. clip the brass strip over the spring and brush and secure before slipping the other end over its ridge. It is recommended that you start by fitting the grey wire contact strip, which is the one for the underside of the motor. Now do the same with the top contact strip (orange wire) if not already completed.
Fit the new plugs to the motor and push the motor into position in the frame making sure none of the wires are trapped underneath. Secure with the screws included in the kit for a more user-friendly method of fixing. Should you need to remove the motor for maintenance in the future this eases the process considerably.
In most cases you are only going to need 4 of the wires in the loom (grey, orange, red and black), as these will be the ones fastened to the motor and to the trucks. However if your loco has headlights fitted then an additional 2 wires (white and blue wires) need be used (*see instruction sheet for directions)*. If a reversing light is also operational then the yellow wire is also used. At this stage all the wires, which are not needed, can be cut back close to the decoder and discarded.

Our next step is the refitting of the trucks and this should be done with care, as we do not want to trap any of our wires in any of the mechanism. Once the trucks are fitted with the universal joints and the tunnel clip above the worm gear, we can move to the next step of the project.

Remembering that we cut back the angled contacts on the trucks we can now fit the red wire with its spade connectors to those reduced size contact strips. It is best to squeeze the spade connectors with a small pair of pliers to ensure these connectors don't come off with any vibration from the loco when it is running. The black wire should now be secured to the riveted contact at the front of the loco frame. Following the advice of a few people I have spoken to, I copied their idea to also attach a wire to the metal on the side of the rear truck (the opposite side to the angled contact strip) with a small bead of solder. This is best accomplished by removing the truck side frame to expose the metal side plate where we can make the connection. Take care not to position this soldered joint too close to the locating holes for the sideframes and keep the wire clear of the truck mechanism. The other end of this black wire can be run either to a joint (heat shrink covering required if you do this) near the motor or taken directly to the riveted contact at the front of the loco frame.
Another option you can use is to drill a small hole in the top of the frame (to the left of the fuel tank is a good place) and use a tap to open up the hole ready for a small screw. The black wire can be fitted to this screw for a good connection.

That done we can now push the decoder into the wired 9 pin connector making sure it is a snug fit. There is only one way the decoder will fit into the 9pin connector so do not try and force the two together. It is worth doing a trial match up to the bodyshell to see where the decoder is likely to lie when fully mounted inside the loco body. Here we should gather all the wiring together and with a small piece of electrical tape or the cable tie supplied fasten up all loose ends. I would suggest the decoder should be located towards the rear of the loco if at all possible and a piece of double sided tape added to help it adhere to the bodyshell under the radiator fans.

At this point it is advisable to test run the loco before the chassis is finally inserted into the bodyshell to make sure all the contacts are working properly. The throttle should be set using address 03 and we expect the loco to move both forward and then reverse if all is well.
If all works as expected then fit the chassis into the bodyshell and go through the test running process again to make sure there are no electrical faults from wires shorting across something within.
If it all works then you have successfully converted your locomotive! Well done!

Terry Wynne – May 2011

Further help on this subject can be found on the following –

http://www.mcor-nmra.org/Publications/Articles/Athearn_TuneUp.html

http://www.youtube.com/watch?v=ePU7qlBhvSo&feature=BF&list=QL&index=1