

Installation Instructions for Digitrax DH165LO Decoder

Note: This installation requires you to be very neat but it is fairly straight forward to do.

- 1) Remove shell from frame.
- 2) Remove plug from factory circuit board.
- 3) Remove the two screws from the frame that holds the circuit board in place and the circuit board itself.
- 4) Because you can't just screw the new DCC board back in place, take a dremel with the fiber cutoff wheel and carefully cut off the screw ridges in the chassis weight so that the whole area where the decoder sits is smooth. CAUTION: Be very careful that you don't cut or damage the wires, this will cause shorts and destroy the motor and/or you decoder.
- 5) I put two plastic shims across the chassis weight width wise and made a plastic base for the decoder to rest on top of the chassis weight where the factory circuit board use to be. Digitrax also tells you to do this as well. The shims I glue to the frame with zap-a-gap CA and the plastic base I glued to the shims with testers model master glue in the black bottle. I found this to be the best combination as far as gluing capability. I didn't need any zip kicker either. After all the glue has set hard I placed the decoder on the plastic base and carefully measured for the indentation that needed to be made for the base of the pins. This step needed to be done so that the decoder rests flat on the plastic base. NOTE: make sure that you leave the shell anchoring tubes open in the frame so that the shell can be replaced.
- 6) After the grove has been made I put the decoder and the plug together and carefully tape the decoder to the frame so that it would not bounce around. NOTE: make sure that the decoder does not interfere with the shell anchoring tubes when you tape it down to the frame.
- 7) Replace shell and couplers.
- 8) Test, program and have fun with you "new" engine.

Installation instructions for Athearn ready to run engines

- 1) Remove shell: these shells are held on in various ways according to the different type of engine you are working on. SD's have shell anchoring screws as well as couple box screws that have to be removed in order to get the shell off. GP's just have couple box screws holding the shell on.
- 2) When the shell is removed there is a factory wire harness in the circuit board already. Remove the dummy plug from the wire harness. Try to find the cheapest decoder you can for this. Keep the Digitrax wire harness for use in other engines and put the decoder in the factory wire harness.
- 3) Secure the decoder to the factory circuit board with a small piece of electrical tape around the decoder and circuit board.
- 4) Replace shell and put shell anchoring screws and coupler boxes and screws back in place.
- 5) Test and program decoder. There is room for ditch lights and 163 decoder functions on the board as well. Ditch lights have to be scratch wired and installed into loco as well.

Installation instructions for DH123AT, DH163AT decoders

Note: These installations are very time consuming to do nice and neat. I have done two of these so far and it is about an hour to an hour and a half time frame.

- 1) Remove shell from frame.
- 2) Mark front truck with letter "F" note: the front truck is always the one on the head light post side.
- 3) Remove trucks and drive train.
- 4) Remove motor and motor mounts from frame.
- 5) Put a piece of electrical tape on the frame where the bottom of the motor would normal come into contact with the frame. This is very important and needs to be down to prevent motor burn up. DCC runs on AC through the frame on these engines, therefore the motor can not contact the frame in any way.
- 6) Carefully remove the bottom motor clip and cut off the two tabs as close to the clip as you can. Solder the grey wire of the decoders wire harness to this clip.
- 7) Replace the clip making sure that the brush is flat against the motors armature and not on the points of the brush. Replace brush spring and motor clip.
- 8) Drill 2 #50 holes in the frame on the ground side. I try to drill my holes where the shell will not hit them in the reassembly process. The ground side of the frame is the side opposite the side of the posts of the trucks. After drilling tap the holes with a 2-56 tap and put a 2-56x3/8" screw in the frame. Note: I do this in Athearn "blue box" engines because the ground side of the trucks that support the frame is not a very good ground for DCC.
- 9) Remove the side frames on the ground side and get two pieces of 25AWG wire or close to it and solder one piece to each truck on this side only.
- 10) After this replace the side frames and reinstall the trucks on the frame and replace the gear towers as well.
- 11) Solder the lose ends of the ground wires to the screws in the frame. By doing this very important step your Athearn "blue box" engine is properly grounded for DCC running.

- 12) After placing trucks back into frame reinstall motor into frame with grey wire coming up along side the motor where it won't interfere with anything. At this time replace the rest of the drive train as well.
- 13) After reinstallation of the trucks and motor, take the black wire from the decoders wire harness and solder it to the headlight post as close to the frame as possible.
- 14) Solder the orange wire to the top motor clip.
- 15) Make sure you have enough of the red wire to go from the wire harness to the front truck and from the front truck to the rear truck as well. Solder these wires in place across both trucks.
- 16) If you do not plan to use any of the lighting wires in you loco I cut them out so that they don't interfere with anything.
- 17) If you plan on using lighting the 123 decoder is great for front and rear lights. If you want head lights, ditch lights, cab interior lights, and back up lights the 163 decoder does good for this although it is more expensive,
- 18) For head light and rear light wiring get some 12v 30mA grain of rice bulbs and a brass tube to fit the bulb into. Cut a piece of tube for each light you want to use and glue it in place where the light will shine through the nose and rear light housings in the shell. I use brass because you don't have shell melting problems around the light because the brass acts like a heat sick. Connect the common wire of the bulbs and the blue common wire of the wire harness together and solder this connection. After soldering, shrink wrap this solder joint. For the front light to work solder the other lead wire and the white wire from the wire harness together. For the rear light connect the other lead wire and the yellow wire together.
- 19) With the 163 decoder the other two wires the green and violet are used for the other two functions. These can be used for ditch light control and number boards as well. The wiring is the same here as well. For ditch lights take on of the leads from each light and solder them together with the blue common wire. The other two leads solder together with one of the two function wires. I would use 1.5v bulbs and install ditch light castings through the cab for this thou. For this you do have to do some research and put some resisters inline to run these lights off of the decoder.
- 20) After all the wiring is completed the shell can be placed on your programming track and programmed.