

Decoder Installs – Hints and Tips

A few Hints and Tips about a very basic decoder. In my opinion these happen to be the best non sound decoders – the TCS T1 or M1 or Z2. The install and programming of these 3 decoders is identical, the only difference is the physical size of the decoders.

There are seven wires hanging out of these decoders and they are all a different colour. The colour code is standard across all NMRA compliant decoders of all brands. The first 2 are Red & Black, these are the pickup wires from the track – the red wire goes to the right hand side of the loco and the black goes to the left hand side. In brass locos this comes down to red on the loco and black on the tender, but, as you will see extra pickups are a must – but that is another clinic.

The next two wires are the Orange and Grey wires these go to the two motor terminals. At first try it is not important which wire goes on which motor terminal all that will happen is that the motor will go in reverse.

You can try the above – on the bench – without a loco or layout.

Next are the three lighting wires, the white goes to the front headlight and the yellow goes to the backup light. Now, the last wire the blue one is the common for all functions and is connected to both the front and rear lights.

Sound good so far, but we have a small decision to make – are the lamps 12 volt lamps or 1.5 volt lamps or LEDs?

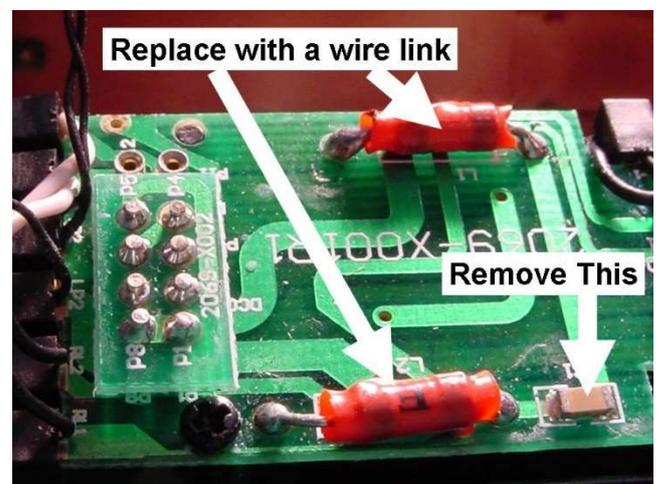
- If they are 12 volt lamps then just wire as above – warning when lamps stay on they can get hot – melt plastic.
- If they are 1.5 volt lamps then you will need a resistor for each lamp – and plenty of spare lamps as they blow very easily. The resistor value will depend on the current of the lamp – get it wrong and the lamp is too dull, or, you blow another lamp.
- If they are LEDs you will need a 1000 ohm resistor rated at ¼ watt (1K0 / ¼ w) for each LED. The blue wire is + (positive) and is connected to the longer of the two legs on the LED.

Always put the resistor in the function wire, in this case the White or Yellow. I will explain the reason for this later.

The above applies to all decoders - non sound and sound. In HO scale locos there is often an 8 pin plug and the decoder can plug straight in to this.

The only other variation to the above lighting connections is to follow N Scale or European principles. This means that the blue wire is not used but instead the + leg is connected to the frame (direct to track pickup) – **hence the resistor in the function wire.**

DCC Ready – Plug & Pray

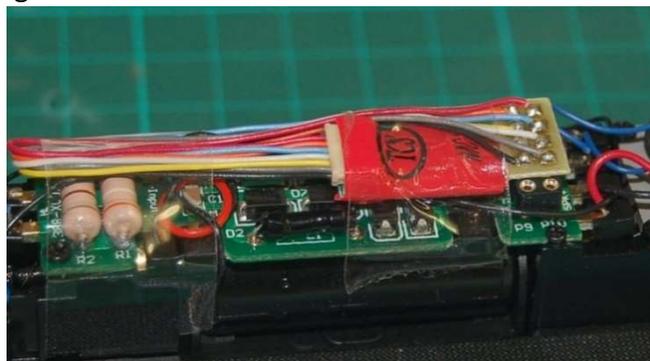


Remove the loco body and look for these bits. Remove the plug on the left and plug in the decoder of your choice. These components are only required if you take your loco on holiday with you – to Eastern Europe. They are NOT required in Australia or the USA.

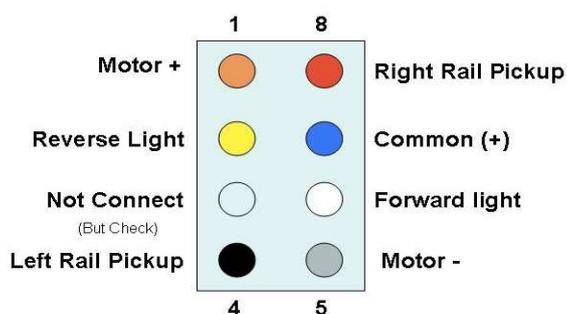


Here is another view of the same components - there are 2 of the “blue” bits.

There are many shapes for decoders, use the Plug & Pray Decoder that best fits the space. When you plug the decoder in and the lights do not work unplug and turn the plug 180 degrees and try again.



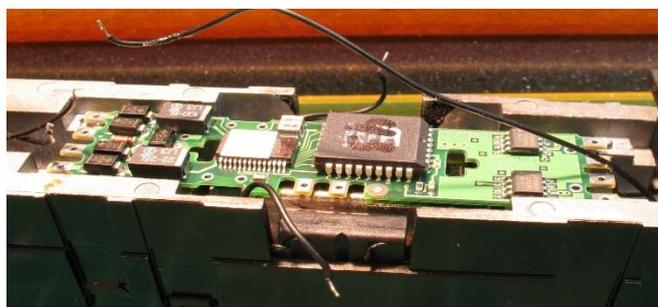
This shows the TCS MC2 decoder – almost the same as an M1 but has the plug on the decoder. Programming is the same for all the above decoders. There is also the DP2X – a decoder the size of the plug – it just plugs in – no leads.



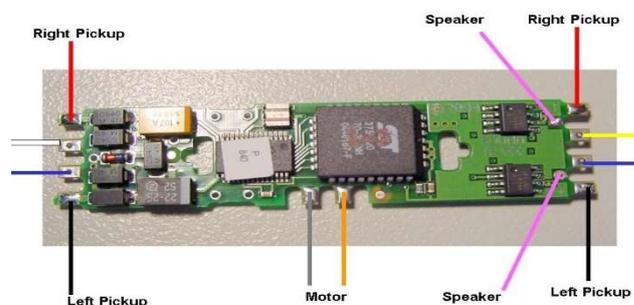
This shows the pin arrangement and their assignment and colour.

Replacing the Board (Known as PNP)

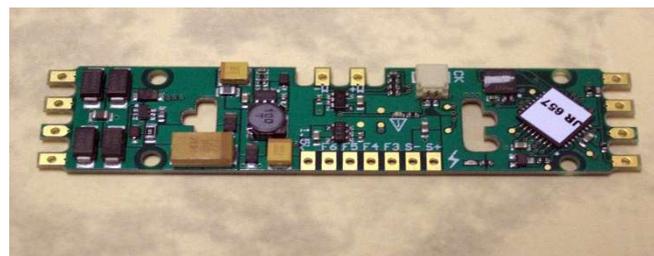
Some decoders replace the whole board, these are the connections. Use double sided tape under the decoder to hold it in place – for both methods.



TSUNAMI 1



TSUNAMI 2



Same physical size and main connections are the same – but this one has six output functions.

It is always good to test your decoder on a decoder tester before you install it. ALL decoders have a default address of [3] when you take them out of the packet.

It is also a good idea to do the basic programming at this point. Set the address (the number on the side of the cab) and CV3 = 10, CV4 = 6. The rest of the programming can be done “On the Main” = “OPS Mode”.

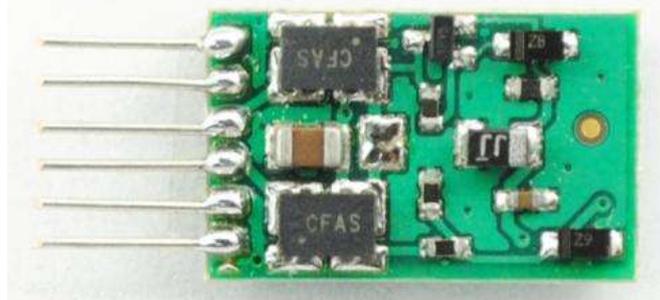
The straight 9 pin plug has standard connections. Normal connections are in this order:

- Green – Extra function – normally F5 (-)
- Black – Track Left
- Grey – Motor (-)
- Yellow – Backup light (-)
- White – Headlight (-)
- Blue – Common (+)
- Orange – Motor (+)
- Red – Track right
- Brown – Extra function – normally F6 (-)

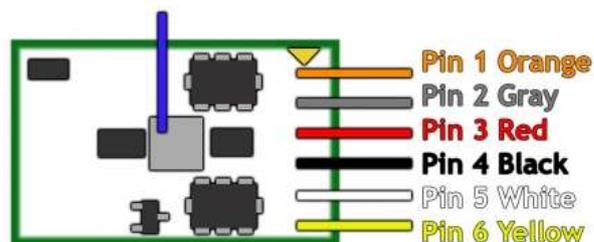
With LEDs the long leg is (+) and goes to the blue wire. Unless you have a peculiar application use a 1K0 ohm resistor in series with each LED. This normally mounted on the short leg.

The latest form of connection is the 21 pin decoder. There are basically two types - the NMRA and the NEM. The difference is with the output functions – the NMRA has 8 normal outputs and the NEM has 4 normal outputs and 4 signal level outputs.

All the locos I have come across are labelled NEM capable – BUT – nearly all the Australian locos only use the white and yellow outputs so either can be used. The first loco with more functions is the Auscision 48xx class – it uses all 8 outputs.



backup light. In this case the “positive” side of the function is connected to one of the track pins.



There is an optional solder pad for the +12 if needed but the + side is connect to one of the loco pickups – IN THE LOCO.

This sort of connection comes in handy for models in other scales. The Blue wire can be left unconnected and the + side of the function is connected to a track pickup – this is why I always put the resistor for LEDs in the function control wire. This requires running one less wire between loco and tender when installing in a brass type loco.



TSUNAMI 2 Has 6 output functions.

TCS WOW Has 8 output functions

All brands of the 21 pin decoders are virtually the same size. As you can see there is one blank pin on the corner, always make sure you mount the decoder correctly.

For those who want a non-sound 8 function 21 pin decoder – the **TCS 8/21** is the way to go.

Not to be outdone, N scalers have the 6 pin decoder. A six pin decoder brings the Question – does it have the usual 2 light outputs white and yellow. The answer is “YES” and it is pointed out that there are only 6 wires. 2 = track pickup, 2 = motor connection and 1 for the headlight and 1 for

Connections for 21 pin Decoder

Input 1	1	22	Track right (red)
Input 2	2	21	Track left (black)
Aux 6	3	20	GND (ground)
Aux 4	4	19	Motor 1 (orange)
TB Clock	5	18	Motor 2 (gray)
TB Data	6	17	Aux 5
F0 r yellow	7	16	(+) Plus (blue)
F0 f white	8	15	Aux 1
Speaker	9	14	Aux 2
Speaker	10	13	Aux 3
Index	11	12	Vcc