

## MERG DCC Programmer

A major advantage of DCC is the ability to change how the decoder behaves while it is in the loco. Most commonly this is to change the 'address' of the loco but there are many other Configuration Variables (CVs) which can be changed including minimum and maximum speeds, acceleration / deceleration rates and how the various functions work.

All commercial DCC systems that I am aware of allow you to 'program' the locomotive decoders by pressing a sequence of keys on the same handset (cab in US jargon) as you use to control the loco. However, while programming, the loco must be placed on or driven onto an isolated piece of track which is connected to separate outputs on the power booster. This means you cannot be controlling a loco and reprogramming at the same time. Also the key pressing sequence is very complicated and prone to errors - at least on the Digitrax and Lenz systems I have tried. The idea of a completely separate and simple to use programmer connected to its own length of track is very attractive, particularly for club layouts where 'drivers' can program or check their locos without having to commandeer a handset or disturb the running of the rest of the layout.

This was the thinking behind the development of the MERG programmer by John Eato and myself. (John did all the hard work).

Specifications.

A self-contained unit with its own mains transformer. Box size 155 x 105 x 45 mm. Simply plug into the mains and connect the output to the programming track.

A 16 character by 2 line LCD display and a 4 x 4 keypad. (I have used a 4 x 3 keypad and 4 separate push buttons as this was cheaper)

The four buttons are :-

Program  
Read  
Mode  
Enter

The mode button toggles between page mode, NMRA direct, ZTC direct and bit direct and can select the format of the number to be either decimal or binary. The 'bit direct' mode is only used for reading on those decoders that support this mode and greatly speeds up reading of larger numbers. (You cannot actually read back the CVs from a decoder. The programmer does a 'verify' on each number starting a 0 up to 255 and looks for an 'acknowledge' pulse when a match occurs. Hence larger numbers take longer to read. In the normal read mode, a value of 255 requires 255 tries, in bit read mode it only takes 8 tries). The ZTC direct mode is not to the NMRA 'recommended practice' where CV addresses actually start at 0 for CV1. ZTC has used address 1 for CV1 so all CV addresses are one digit out. John has included this extra mode for ZTC owners.

To read a CV, select the desired mode and press Read. The display prompts with 'CV'. Key in the CV number and press enter. The display will give the value in both decimal and binary. To program, again select the mode and press program. At the CV prompt, key in the CV number and 'enter'. An '=' will appear so key in the value to be programmed. Then press enter again. CV will be programmed and an OK message will be displayed. If it failed there will be a 'No Ack' message. It is very easy to use.

The programmer conforms to the NMRA recommendations with current limited to 250mA and a check for overcurrent to indicate a fault. There are safeguards to prevent you typing in invalid CV numbers. Only CV 1 to 1024 or data 0 to 255 will be accepted. There is a delete key to correct errors and an escape key to cancel a complete operation.

The programmer is based on a PIC 16F84-04/P microcontroller. A PCB layout (single sided and suitable for DIY) is available on the website as is the source code for the PIC. I can supply pre-programmed PICs if wanted. The circuit diagrams are on the MERG resources website or can be provided as paper copies, as can a laser PCB mask, on receipt of an SAE. Cost of components is about £35 and all are available from Rapid Electronics.

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Revision C