

The MERG DCC Accessory decoder. (Version 2B)

The MERG accessory decoder (version 2b) has its own capacitor discharge unit (CDU) and will drive four pairs of coils with a high energy pulse. The MERG accessory system was intended for 'stand alone' operation rather than the more usual 'off track' operation. There were two reasons for this approach. Firstly, operation via the track generally requires a complex handset or at least relatively complicated sequences of button pressing, including remembering the number or address of each turnout. Without considerable practice and understanding of the handset, changing a turnout while also trying to control the loco is not easy.

The second reason for not using the track is that a short circuit on the track will disable the whole accessory system, including the ability to change the turnout that may well have caused the short in the first place. You are then completely 'stuck'.

Keeping the accessory (layout) control separate from the loco control gets round these problems and has additional advantages.

1. The DCC booster does not need the power to run the accessories.
2. The accessories (turnouts) can be operated with single on / off switches.
3. Switches can be mounted on a 'layout diagram'.
4. Action can be virtually instant, including setting many turnouts at once.
5. The locos remain under full control
6. The whole system can be used with a non-DCC layout, so greatly reducing the amount of wiring.

The MERG accessory decoders are intended for use with the MERG accessory encoders but may be operated by the signal from a DCC track. However, they do not take their power from the track and need a separate 15 to 20v AC, 50 – 60 Hz supply. (many decoders can run off a single low voltage transformer)

Description. (see schematic)

The DCC signal input drives an opto isolator U1. It electrically isolates both the track and the AC power. The MERG encoder provides 12 to 15v for the signal. R1 sets the opto current. It is suitable for any input voltage from about 10 to 25v and this input may be taken from the track. . A PIC microcontroller decodes the DCC information and drives the 8 MOSFET power switches Q2 to Q9. A low power regulator U2 provides the 5v supply for the PIC. Isolated acknowledgement (ACK) is provided through U4 and the switched load R6. CVs can be programmed and read using any DCC programmer. The decoder allows page mode or direct mode programming. The direct mode has full bit manipulation for both read and write. This speeds up CV reading greatly with programmers which use bit verify. Accdec2.asm is for a PIC 16F627 microcontroller running at 8 MHz.

The capacitor discharge circuit is the conventional rapid recharge type but with current limiting so the transformer is not excessively loaded. The same transformer can power other devices, lighting etc. without the flicker apparent with non limited CDUs. The storage capacitors C3 and C4 have a high total capacity (4400uF) and

with a supply of 20vAC, will drive at least two PECO motors simultaneously. Protection diodes for the solenoid coils are included on the PCB. Also included on the Rev2B PCB is the facility for a fixed 12v DC output which may be connected to the output terminal block via a wire jumper. As the decoder outputs may be programmed to be permanently on, this 12v allows signals or aspect lights to be run from the same decoder as the points e.g. two output pairs can run two solenoid point motors and the other two pairs can run the corresponding signal lamps.

Programming

The MERG accessory decoder follows the NMRA standards and RPs for accessory decoders. Each decoder can have one accessory address in the range 0 to 510. (address 511 is defined as a broadcast address). Within that address, four pairs of outputs are defined. Each output can be individually disabled if necessary by clearing a bit in CV514. Also, the time for which an output is 'on' can also be defined. The time unit for the MERG decoder is 10 milliseconds so the on time ranges from 10 millisecs to 2.55 seconds. A value of 0 gives a constant output. The timing operates on each pair of outputs and it is not possible to set one of a pair to a different time than the other. For CDU use, 20 millisecs is a suitable value.

CVs used

CV513	low 6 bits of address	range 0 to 63	default 0
CV514	output activation, 1 = on, 0 = off	default is all on	11111111
CV515	on time for F1	range 0 to 255	default 2
CV516	on time for F2	range 0 to 255	default 2
CV517	on time for F3	range 0 to 255	default 2
CV518	on time for F4	range 0 to 255	default 2
CV519	version number	fixed	2
CV520	manufacturer ID	fixed	13
CV521	hi 3 bits of address	range 0 to 7	default 0
CV541	configuration	fixed	10000000

Mike Bolton 25/03/03

A separate accessory decoder (version 3) has been specifically designed for 'tortoise' style point motors or bulbs, LEDs or low power solenoids such as those for semaphore signals. Version 3 does not have the CDU facility.