

Low Cost DCC (LC-DCC)  
LC-DCC Pre Built Controller Models Reference Guide  
June 2019

## Summary

Provided in this document are the details of the LC-DCC pre built controller hardware designs available and how to use and update them.

The pre-built designs can be purchased on eBay.

## Disclaimer

The designers accept no responsibility for any damage to any train or accessory decoder connected to this DCC system through incorrect assembly or use of the hardware design.

Please read s-9.1\_electrical\_standards\_2006.pdf NMRA standard before purchasing and using a power supply. Also note some cheap power supplies can give over voltage output.

## License / Usage Terms

All the software components are protected by license. When buying the controller from eBay, a license will be provided.

## LC-DCC Forum

A low cost DCC forum can be found at <http://low-cost-dcc.freeforums.net>, this was created in March 2019.

## Buying On EBay

Please note that there are a number of false adverts on eBay that cannot provide support or valid updates for this project and may not even provide anything for your money. The idea of Low Cost DCC is to make available a quality product at a price that everyone can afford. Only buy from the designer and developer of this project. To ensure you are buying from the only official eBay listing check the seller information is as displayed below (seller: johncaffyn, location: Bristol). Any other listing is false.

Low Cost DCC Controller 2amp or 10amp with CV programming and BlueTooth

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Low Cost DCC 2.0

Configuration Track Control Check Updates  
Service Mode Time Table Exit LC-DCC

Have one to sell? [Sell it yourself](#)

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## Introduction

This book describes the different LC-DCC controllers available as pre-built kits with minimum effort required to get using them.

The LC-DCC controller models come partially assembled and are sold on eBay. All models use the same Windows and Android software to control them.

All units can be upgraded using various reprogramming mechanisms described in the document.

# LC-DCC-BT-M1

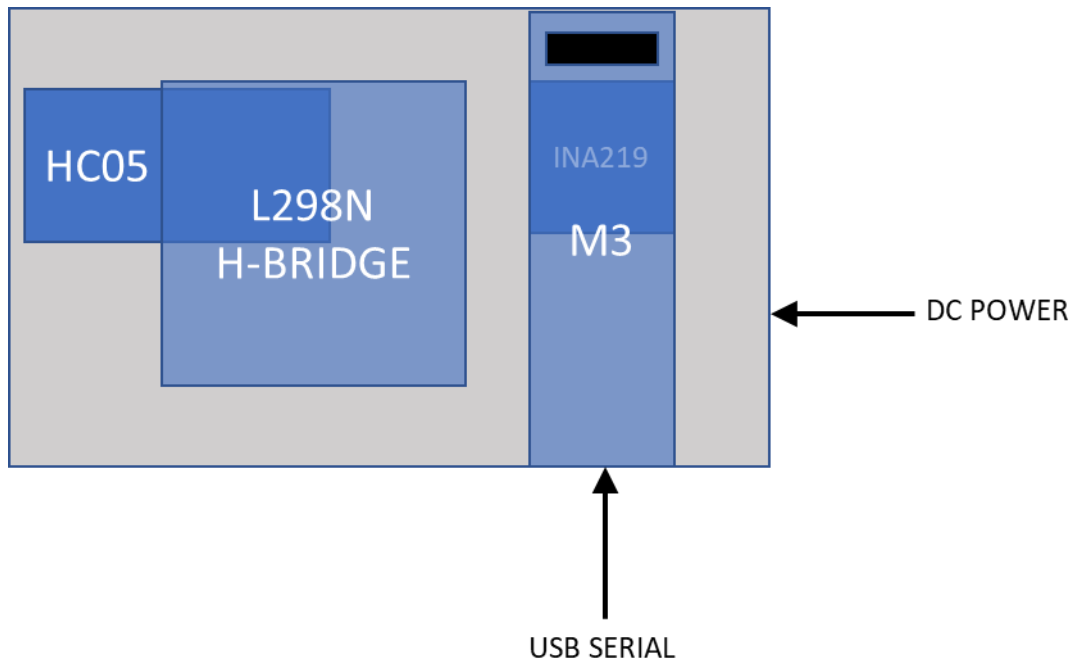
## Features

This LC-DCC controller features:

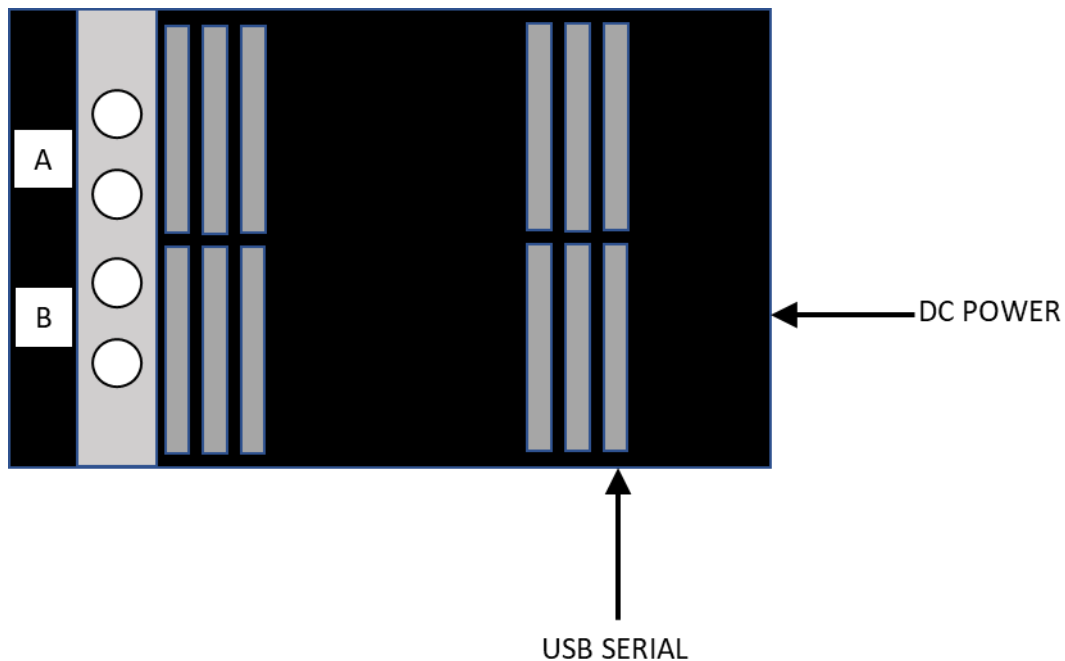
- STM32F103 blue pill processor board
- INA219 current monitor
- L298 H bridge
- Total maximum output 3.1 amps
- Two track outputs, maximum 2 amps per track
- Bluetooth interface
- USB Serial interface via micro USB connector
- DC 5.5mm x 2.1mm power supply connector
- Screw terminal connections for each track connection

## Components

The following block diagram shows the main LC-DCC-BT-M1 components. The reprogramming connector is shown in black. The 0V of the reprogramming connection is nearest the L298N. To program the M3, the 0V connection on the debug connector must be removed and replaced after programming. To program the M3 see the programming section in this document.



The top view of the LC-DCC-BT-M1 shown below shows the connections for tracks A and B, the USB serial port position and the DC power connector position.



## Installation

When installing the LC-DCC-BT-M1 please ensure there is free air flow to the air vents located on top on the unit.

Mount the unit with the air vents on top and do not obstruct them.



## LC-DCC-WF-M1

### Features

This LC-DCC controller features:

- STM32F103 processor board
- INA219 current monitor up to 6.4 amps
- IBT-2 for track and train control
- L298 H bridge for CV programming
- Total maximum output 6.3 amps
- One track output, one CV programming output
- WIFI interface
- USB Serial interface via micro USB connector for network configuration
- DC 5.5mm x 2.1mm power supply connector
- Spring terminal connections for each track connection
- Available later in 2019



## Licensing

The software within the M3 processor, the Windows Application and the Android application are protected by an authentication license. When you first use the controller with either the Windows or Android application you will be asked to contact [support@swws.co.uk](mailto:support@swws.co.uk).

However, provided with your controller unit is a license code and you will only have to contact [support@swws.co.uk](mailto:support@swws.co.uk) if you lose this license code.

## Programming

The M3 processor can be programmed either by using a USB FTDI Serial adapter or by using an STM ST-LINK V2 USB programmer (recommended method).

USB FTDI Serial Adapter	STM ST-LINK V2
	

If using the STM ST-LINK V2 programming adapter you must download and use the STM32 ST-LINK Utility from STM website: <https://www.st.com/en/development-tools/stsw-link004.html>.

If using the USB Serial adapter, you must download and use the flash loader demonstrator software from STM website: <https://www.st.com/en/development-tools/flasher-stm32.html>.

## STM ST-LINK V2 Programming Procedure

The following describes programming using the ST-LINK V2 adapter and the ST-LINK Utility software. Perform the following:

- Turn off the M3 processor board
- Connect the ST-LINK V2 to the debug connector on the M3 processor board
- Power the M3 processor board
- Run the ST-LINK Utility software

## USB Serial Adapter Programming Procedure

The following describes programming using the USB Serial adapter and the STM flash loader software. Perform the following:

- Turn off the M3 processor board
- Connect the USB Serial adapter to board pins PA9 (TX1) and PA10 (RX1)
- Connect yellow jumper boot0 pin to 3V3 and connect yellow jumper boot1 pin to GND
- Power the M3 processor board
- Run the STM flash loader software

## Version Change History

### **June 2019**

Added complete DC connector description.

### **April 2019**

Initial version.