# Model Electronic Railway Group

## 8-channel Output Module (CANACC8) – Kit 88

## Building Instructions

**Issue 4 October 2022**

*These are the Building Instructions for Kit 88 CBUS 8-channel Output Module (CAN_ACC8) which is used to control up to 8 layout accessories such as relays and signals from your CBUS system. Do take a few minutes to read right through these Instructions before commencing assembly and begin by checking through the kit contents shown on the back of the kit label or page 3 of the downloaded document. If any items are missing please contact the Kit Sales Manager. These instructions refer to Rev D of the printed circuit board (PCB).*

***Static Precautions are vital when handling the major Integrated Circuits, such as the CANACC8 PIC, which should be left in its protective packaging until instructed to install.*** *It is also recommended that the builder has read through Technical Bulletin G32/1 which provides an introduction to the CAN_ACC8 driver board, how it works and how it is taught.*

A schematic for this module can be found on page 3 and a contents list on page 4.

Assembly starts with the smallest items first to allow the pcb to lie flat on the bench when soldering.

Fit the 4 wire links and also LK1 if this module is powering other CBUS modules.

Fit resistors R1 - R10.

Fit the bridge rectifier BR1, ensuring the correct orientation.

Fit pushbutton S1. Although this is not used in SliM mode, fitting it now allows for future upgrades to FliM mode if required. This can be fitted either way round.

Fit the 8-way, 18-way and 28-way Dual-in-line (DIL) IC sockets, with the 'bite' corresponding to the bite shown on the printed overlay, ensuring the base of the holder is lying flat to the board. Note, the ‘bite’ on U1 is at the opposite end of the PCB compared to the others. ***Do NOT fit the ICs yet***

Fit the 3-pin trimpot VR1 and set it to mid position for later testing.

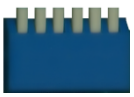
Fit the 3 pin 4Mhz resonator X1. This may be fitted either way round

Fit the three Tantalum* capacitors C2, C3 & C4 observing polarity ('+' marking on capacitor to '+' on the overlay.) Do not fit C1 yet. *Note that capacitor C3 could be supplied as a 10uF/35V electrolytic type depending on supply. This is non-critical.

Fit the LEDs LD1 (yellow) & LD2 (green) observing polarity. The + of the LED is marked on the drawing, this is the longer of the 2 leads.

Fit the 6 way DIP Switch (DIL1) (piano keys to outside if supplied)

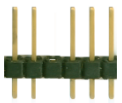
or



Fit the terminal blocks J1 and J2, ensuring that the cable entry is to the outside of the board and that the block is flush to the top surface. J2 is assembled from two modular 2- way terminal blocks which have small tongues and grooves to lock the sections securely together. Ensure these are properly mated or the block will not fit in the PCB correctly.

Terminal blocks are also provided in the kit for J3 but the PCB has been provided with alternative pads to fit 10 way 2.54mm Molex-type connectors (not supplied) which must be purchased separately (eg. Rapid JYK types or MERG 6800-series). Additionally some builders might prefer to fit 3.5mm pluggable terminal blocks (eg. Rapid 21-3027 – 3046 types) also purchased separately. If it is planned to use the LCB Experimenter’s Kit (490) to test this module then please consult that kit’s Notes before selecting and installing this connector.

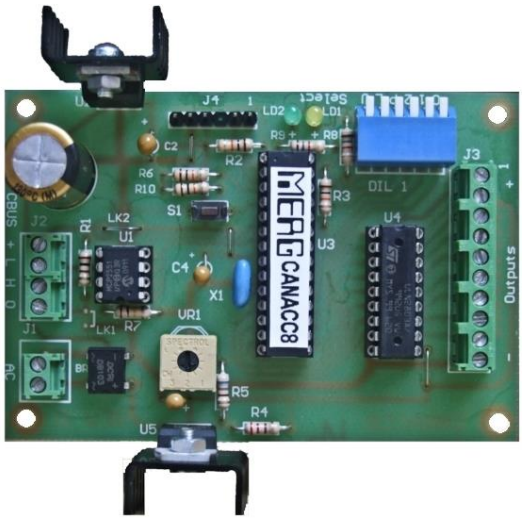
Fit the header J4. Note that only 5 of the 6 pins are used. Pin 3 should be removed (see picture right). There is no hole for Pin 3 on the board.



Fit the 3 pin voltage regulators U2 & U5, with the ***metal tabs facing outwards from the edge of the board. Be careful not to mix these two up.***

Fit the heatsinks. Note that fitting the heatsink on U2 may be difficult once the large capacitor C1 is fitted.

Fit capacitor C1, observing the correct polarity. N.B. The positive end of C1 is shown as "+" on the PCB layout, this is the pin opposite the end marked with the white stripe and "-"on the actual capacitor.




## Testing

Check that the completed board looks similar to the photo here and carefully check the PCB trackside for any unsoldered or bridged joints.

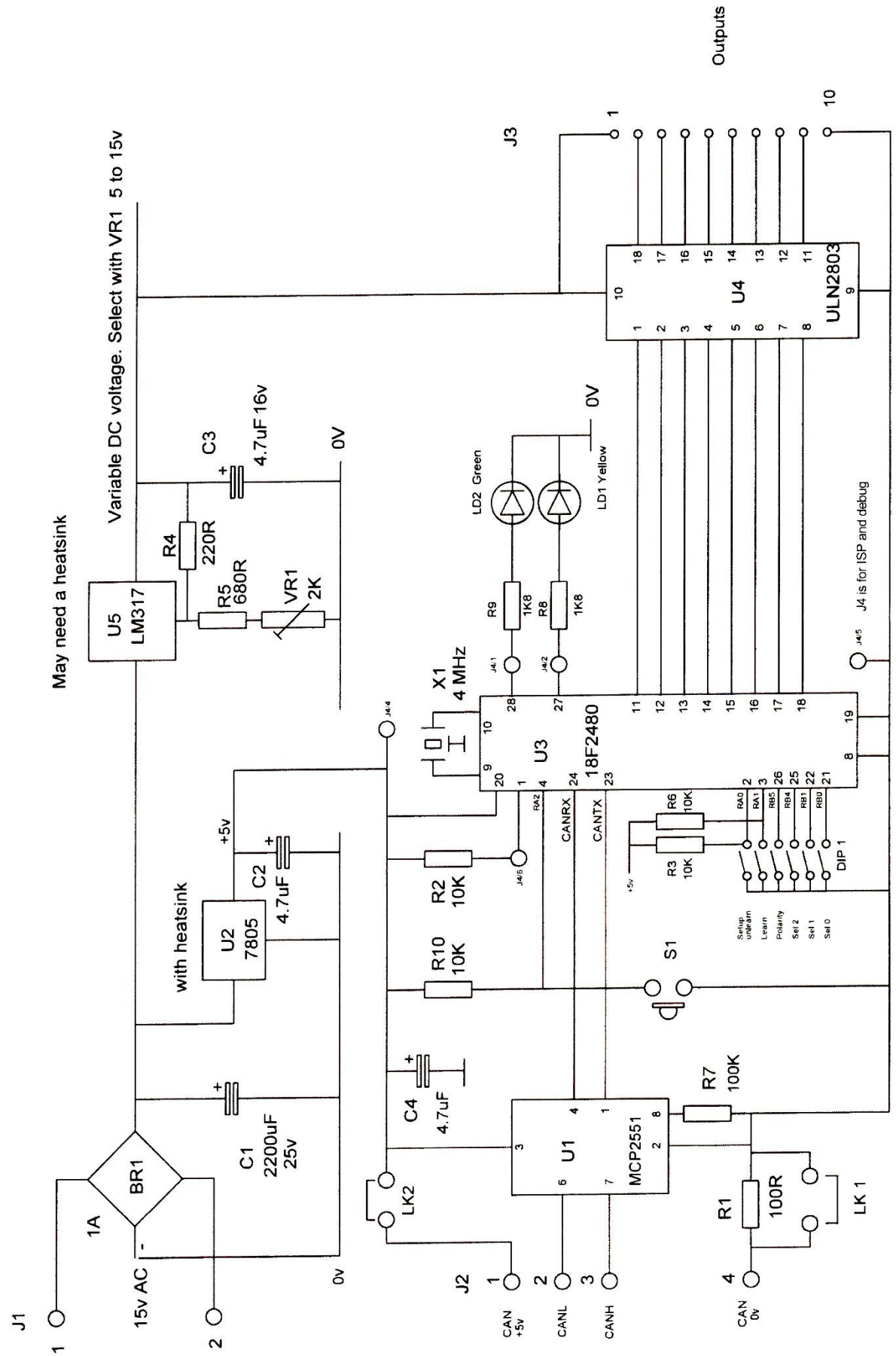
Connect a 15 – 16Vac power supply to J1 and wait 30 seconds. Check that neither of the regulators U2 and U5 are getting hot. If they are, disconnect power and re-check for PCB track shortcircuits.

Using a standard multimeter set to its Vdc range check that there is approximately 22Vdc across the terminals of C1.

Check that 5Vdc is found across the terminals of C2 and pins 20 and 8 of the U3 DIL socket.

If all is well, disconnect the power, and fit ICs U1, U3 & U4 ***observing static precautions***. The IC 'bite' corresponds to the bite on the DIL sockets. Reconnect power and the GREEN LED only should illuminate.

Recheck the voltages as above being careful not to short pins with the meter probes. You now have a correctly working CBUS module. Refer to the latest issue of **TB G32-1** for Teaching and Putting to Use.




CANACC8 Schematic

**Acknowledgements**
Circuit Design and PCB Layout – Mike Bolton
Kit Crafting – Howard Watkins
Kit Documentation – Howard Watkins and Martin Perry

**Kit Contents**

| Type | No. | part | | Type | No. | part |
|---|---|---|---|---|---|---|
| PCB Rev D | 1 | | | 2K trimpot | 1 | VR1 |
| 100R 1/4W resistor (brown–black–brown) | 1 | R1 | | 28 pin CANACC8 IC (PIC18F2480) | 1 | U3 |
| 10K 1/4W resistor (brown-black-orange) | 4 | R2, R3, R6, R10 | | 18 pin ULN2803A Darlington Driver IC | 1 | U4 |
| 220R 1/4W resistor (red-red-brown) | 1 | R4 | | LM317 voltage regulator (3 pins)* | 1 | U5 |
| 1K8 1/4W resistor (brown-grey-red) | 2 | R8, R9 | | Heatsink | 2 | For U2, U5 |
| 680R 1/4W resistor (blue-grey-brown) | 1 | R5 | | 4 MHz resonator | 1 | X1 |
| 100K 1/4W resistor (brown-black-yellow) | 1 | R7 | | 2-way terminal block | 1 | J1 |
| Yellow LED | 1 | LD1 | | 4-way terminal block | 1 | J2 |
| Green LED | 1 | LD2 | | 10-way terminal block | 1 | J3 |
| 10uF 35V tantalum or electrolytic capacitor | 1 | C3 | | 8-way DIL IC socket | 1 | For U1 |
| 4.7uF or 10uF/16V tantalum capacitor | 2 | C2, C4 | | 18-way DIL IC socket | 1 | For U4 |
| 2200uF 25V electrolytic capacitor | 1 | C1 | | 28-way DIL IC socket | 1 | For U3 |
| 1A bridge rectifier | 1 | BR1 | | 6-way header | 1 | J4 |
| 8 pin CANBUS transceiver IC (MCP2551) | 1 | U1 | | 6-way DIL switch Note – may be piano key type | 1 | DIP1 |
| LM7805 voltage regulator (3 pins)* | 1 | U2 | | miniature pushbutton | 1 | S1 |

*These regulators look the same. Please check their markings before installation.