MERG Knowledgebase

CANCDU

Overview

CANCDU is a member of the CANMIO family of CBUS boards and has the identical form factor.

The CANCDU is a 12V DC powered implementation of a CANACC4/CANSOL, to drive up to 4 solenoid point motors, which also has an additional I/O connector as fitted to the CANMIO and CANBIP.

CDU refers to Capacitor Discharge Unit, as required to drive solenoid point motors.

CANCDU is derived from Mike Bolton's CANACC4/CANSOL design, to whom due credit is acknowledged.

CANCDU provides 8 CDU outputs, which can be used in pairs to drive 4 solenoid point motors.

In addition to the 8 CDU outputs, CANCDU has provision for an additional 6 I/O signals via en expansion connector, as found on CANMIO and CANBIP.

The CANCDU has been used successfully on a number of layouts.

FAQ

1. What is the difference between CANSOL and CANCDU?

A: CANCDU is the same form factor as the CANMIO and CANBIP, with the connectors in the same places. This provides up to 6 extra I/O pins in addition to the solenoid outputs, see the firmware section below. It can also use daughter boards designed for the CANMIO family.

CANCDU can accept capacitors from 2200uF to 4700uF (larger capacitors may require longer recharge times to be configured using FCU)

CANCDU uses a separate SLiM config module instead of on board switches

2. Why only 6 extra I/O pins, compared to 8 on the CANMIO and CANBIP?

A: The CDU design requires the use of 2 extra PIC pins for voltage doubler and current limit functions, so this leaves less available for the additional I/O.

Firmware

CANCDU runs a modified version of the existing CANSOL firmware, built from the same source file.

This firmware supports the additional 6 on/off inputs via the expansion connector. These additional inputs are not configurable in any way and this firmware is provided as a stop-gap until a version of the fully flexible CANMIO (Universal) firmware is available for the CANCDU, which is currently under development.

You can use these inputs for turnout position feedback, block detectors or any other on/off digital input.

CANCDU rev 1c BETA 2

This firmware runs on the PIC18F25k80 or PIC18F26k80 and requires a 16MHz crystal to be fitted to the board in the X1 position.

If you have an older PCB revision that is only laid out to fit a 3 pin resonator, you can use a crystal adapter board to fit the crystal.

CANCDU can run a variant build of the the "universal" firmware, referred to as CANCDU_U which also supports the voltage doubler and current limiter. This variant has been developed by Ian Hogg and is under test. This will allow flexible selection of the 6 expansion I/O signals as digital inputs, digital outputs or servos, and more flexible use of daughter boards.

CANCDU_U uses the PIC18F27Q83 processor, which no longer requires a capacitor on pin RA4, so with an update to the firmware and a revised PCB layout, the number of expansion channels could be increased to 7.

Older versions: CANCDU rev 1c BETA 1 (4 MHZ resonator)

Hardware options

As described below, CANCDU is included in the proposal document that has been submitted to the MERG committee for the CANMIO family to become MERG kits. It is less likely that the CANCDU will be adopted as a kit because the CANSOL has only recently been released.

In the meantime, PCBs and parts kits continue to be available from *Pete Brownlow [http://www.merg.org.uk/forum/memberlist.php?mode=viewprofile&u=387]* via his webshop at RME [https://www.rmeuk.com]

Note that the Rev A design has an error. C5 should be 470uF not 4.7uF. Fitting the capacitor that is 100 times too small results in a much longer charge time for the capacitor.

You can squeeze a correct 470uF capacitor onto a Rev A board.

Rev B boards onwards have been laid out with sufficient space for the correct capacitor to be fitted without difficulty.

Documentation

A full user guide will be produced in due course.

At present, the following documents are available:

Kit proposal document for CANMIO/CANBIP/CANCDU range

CANCDU Schematic rev C

The changes from rev B to rev C are as follows:

- + sign added on PCB for Red LED
- bigger PCB pads for LEDs and transistors/voltage regulator
- Diode D15 added to protect the doubler circuit in case of reversed power polarit
- Space to fit either a resonator or a crystal with two capacitors. The crystal option is recommended.

Old Versions: CANCDU Schematic rev ACANCDU Schematic rev B

If you find any errors in the above documents, please feed back your findings via the forum.

CANCDU in SLiM and FLiM

The FCU program will support the CANCDU in FLiM when running the CANCDU firmware. The configuration options will appear identical to the CANACC4/CANSOL.

For SLiM , CANCDU uses an external SLiM configuration module containing the switches, which plugs into the additional I/O header. The current Beta firmware supports SLiM configuration using this plug in configuration module.

Daughter Boards

Daughter boards can be designed to plug on to the CANMIO, CANBIP or CANCDU boards. The existing MIOADD daughter board can be used with the CANCDU to provide a terminal block as a convenient way to connect the additional 6 inputs. Alternatively, you can wire the inputs directly into the expansion connector.

To use full size daughter boards, such as MIODTC8, with CANCDU, you either need to use longer standoffs and fit the expansion connector on a shim, or fit the FETs on the underside of the CANCDU and use longer standoffs to mount the assembly, to avoid the FETs fouling the daughter board. You could also use ribbon cable to connect the CANCDU and daughter board and mount them side by side.

A 4 channel relay board, which is small enough to fit around the FETs, has been developed for use with frog switching, and it under test.

For details see CANMIO range daughter boards

Lead Developer

This project is currently coordinated by *Pete Brownlow [http://www.merg.org.uk/forum/memberlist.php?mode=viewprofile&u=387]*

cansol, cbus
