

DCDC-USB-200

6-34V high power, Intelligent DC-DC converter with USB interface

Quick Installation Guide

Version 1.0c
P/N DCDC-USB-200

Introduction

The DCDC-USB-200 is a powerful DC-DC power supply designed to power a wide variety of devices. This DC-DC has a range of intelligent functions not found in any tradition USB converters. Features include USB interface, programmable output voltage and scripting as well as automotive modes.

The DCDC-USB-200 device is able to send ON/OFF 'pulse signals' to motherboards based on voltage levels or Ignition sensing, making it an ideal device for automotive or battery powered installations.

This unit has a wide input range (6-34V) and it can provide a tightly regulated output ranging from 6 to 24V (default set to 12V). Emissions are reduced using 2 out of sync, spread spectrum buck-boost converters.

Quick installation Instructions

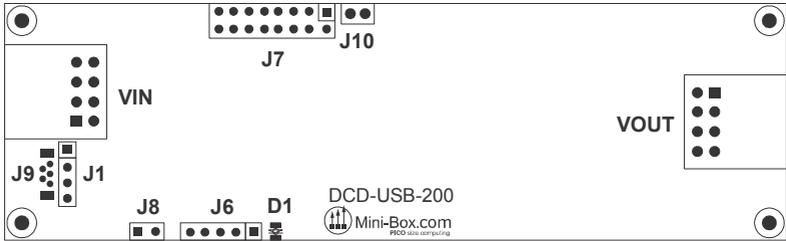


Fig 1.0, DCDC-USB-200 layout

J7: Configuration jumpers for Voltage, Mode and Timings.

Left mini-FIT connector: Power input, V(in) – (Red), GND, Ignition *(Yellow)

Right mini-FIT connector: Power output V(out), GND.

J8 : Soft ON/OFF control for motherboard. Connect this to motherboard ON/OFF pins if you want the motherboard to be controlled by the unit.

J9: mini-USB type B jack. Connect this to a PC to access advanced settings.

J1: USB header for internal connection.

D1 STATE: State LED

J10 : Provides unregulated switched input, to be used in automotive modes to power various peripherals.

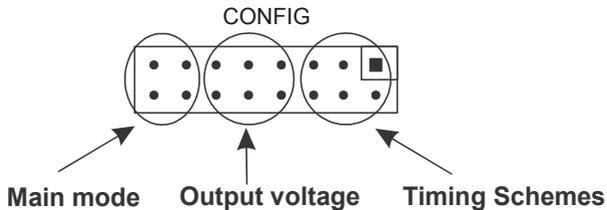
Basic Operation

For basic operation, you would need to connect a power source to V(IN). V(IN) is on the left side of the board, near the input fuse. Polarity is marked on the PCB (GND, VIN and Ignition). On the cable harness, GND is black, V(in) is red and Ignition is white. NOTE: Ignition is not needed for basic operation.

Without any further settings, V(out) will generate 12V regulated. V(out) is located on the right side of the PCB, near the USB connector. On the cable harness, Yellow is positive and GND is negative.

Configuration jumpers

The configuration header J7 (marked CONFIG) is the most important header in this board. It is divided in 3 sections:



Main mode. This header section sets one of the 3 main mode of operation: DUMB mode, Automotive mode and the SCRIPT mode.

Output voltage. This header section sets the output voltage of the unit.

Timing Schemes. This header section sets the OFFDELAY and HARDOFF timers, only available in the Automotive mode.

Configuration, voltage settings

By default, the DCDC-USB-200 module provides regulated 12V output. Should you need other voltage levels, you can change output voltages by setting jumpers 2, 3 and 4, see table 1.

After making a jumper change, the DCDC-USB-200 unit needs to be power cycled in order for the new setting to take effect. **NOTE:** Finer voltage adjustments are available via USB settings, see Advanced USB Configuration manual.

		Output voltage							
		7	6	5	4	3	2	1	0
12V		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5V		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6V		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9V		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.5V		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16V		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19V		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24V		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Configuration, Mode of Operation

DCDC-USB-200 has 4 modes of operation. This modes can be changed via jumpers.

1) DUMB mode. The units acts as a regular DC-DC converter. Only V(In) and V(out) and GND terminal are required. Unit will convert any input from 6-34V to a fixed voltage. Default voltage is set to 12V.

2) AUTOMOTIVE MODE. In this mode, the unit acts as as Intelligent DC-DC converter that is aware of Ignition state. In this mode the unit reads the Ignition terminal and based on Ignition statuts the unit sends ON/OFF pulses to a motherboard in order to start or stop. In this mode, two variables can be set: OFFDELAY and HARDOFF. See Default Timing Schemes for more information.

3) SCRIPT MODE. This is an advanced mode where unit can be scripted to perform various tasks based on user scripts. Please refer to Advanced USB programming manual for more details.

4) UPS MODE. Module is a DC UPS (Uninterruptible Power Source) module.

		Main mode							
		7	6	5	4	3	2	1	0
DUMB		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AUTOMOTIVE		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SCRIPT		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					
UPS		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>					

Default Timing Schemes

When unit is set to operate in the Automotive Mode, 8 timing settings are available. These are combinations of OFFDELAY and HARDOFF timers. NOTE: These settings work only when the Ignition wire is used.

OFFDELAY is the amount of time the unit waits until it sends an ON/OFF pulse the motherboard’s ON/OFF pins after Ignition has been turned off.

HARDOFF is the amount of time the unit will still provide power after the ON/OFF pulse has been sent to the motherboard. If you have a battery sensitive application, set the HARDOFF to 1 minute to avoid battery drain. While in HARDOFF, the unit carefully monitors the battery and if battery voltage goes under 11.2V, power will be cut off in order to prevent battery drainage.

		Default timing schemes							
OffDelay	HardOFF	7	6	5	4	3	2	1	0
0	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
5s	60s	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5s	Never	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
1min	1min	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 min	1min	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
15 min	Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30 min	1 min	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
2 hour	Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Electrical and Environmental Specifications

Minimum Input Operating voltage	6V
Maximum input Operating voltage	Electronic shut down at 34V (clamping will occur 34-36V)
Deep-Discharge shutdown threshold	11.2V
Input current limit	15A (20 A mini-blade fuse)
Max Output Power (peak)	160 watts or 15A input current
Regulation accuracy	2.5%
Operating temperature	-40 to +85 degrees Celsius
Storage temperature	-55 to +85 degrees Celsius
MTBF	>100,000 hrs @ 65C body temp.
Efficiency (Input 9-16V)	>94% (output = 12V 2A)
PCB size	160mx45mm
Input, output connectors	Right angle, Mini-FIT JR 4 pin

*NOTE: At output power greater than 60watts or if unit temperature exceeds 65C, forced air ventilation will be required in order to prevent unit from excessive thermal stress for long period of times.

12V output max current charts

Input (V)	12V rail current	Input (V)	12V rail current
6V	6A	11V	12A
7V	7A	12V	12A (15A peak)
8V	8A	14V	12A (15A peak)
9V	9A	14-18V	12A (15A peak)
10V	10A	20-32V	10A

NOTE: Peak consumption should not exceed 60 sec, forced ventilation required.

Operating environment: Temperature: -20 to 65 degree centigrade.
Relative Humidity: 10 to 90 percent, non-condensing.

Efficiency, MTBF: MTBF >100K hours at PSU(temp) < 65 Celsius.
NOTE: All solid polymer capacitor design, rated >50K hours at 85C or 500K hours at 65C.

Shipping and storage: Temperature -40 to +85 degree centigrade. Relative humidity 5 to 95 percent, non-condensing.