TONO III Intelligent Automotive Power Supply Unit

Description

The TONO III DL-150W DC-ATX power supply is designed for Car PC use. The TONO III operate over an input voltage range of 7 Vdc to 24Vdc and provide a precisely regulated dc output. The TONO III utilize three synchronous buck controller. It has maximum power ratings from 110 W to 150 W at a typical full-load efficiency of 89%. It features over voltage/short circuit protection.

A built in intelligent timing controller (8bit Flash MCU) makes TONO III flexible for meeting the vary Car PC system. Timing is changeable according to different needs.

Applications:

Automotive / Car PC

Features

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- 6-20Vdc wide input range, Max output at 10V-14V.
- Intelligent power timing controller
- Programmable timing settings via RS232 of PC.
- ON/OFF motherboard control
- Survives vehicle engine cranks
- Battery deep discharge prevention
- High efficiency, 150 watts output
- Works with 12V / 24V car batteries(TONO III)
- High Efficiency, 90% Typ.
- Over voltage/under voltage, over current protection
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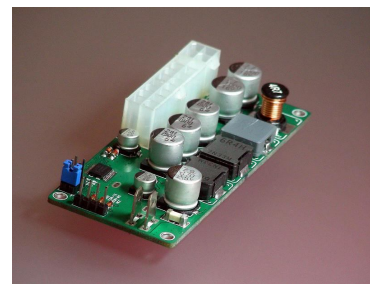
Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit
Input Voltage Continuous Transient	 9 7	 13	 20 24	 Volt
Operating Temperature	-20	25	60	°C
Shipping and Storage Temperature	-40		80	°C

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Electrical Specifications

Output Specifications

Maximum Power Characteristics			
Output Rail	**Current typ**	**Current Peak**	**Regulation**
5V	8A	11A	2%
3.3V	8A	11A	2%
5VSB	1.2A	1.5A	2%
-12V	0.2A	0.3A	5%
12V	3A (see below)	4.5A (see below)	3%

12V Rail Output Current (12V buck/boost converter)	
Input (V)	**12V out current**
6-8V	2A (3A peek)
9-11V	3A (4.5A peek)
11-16V	3A (4.5A peek)
16-20V	2A (3A peek)

Feature Descriptions

Overcurrent Protection

To provide protection in a fault (output overload) condition, the Tono III is equipped with internal current-limiting circuitry and can endure current limiting for an unlimited duration.

Over voltage/under voltage Protection

| Parameter	Min	Typ	Max	Unit
Input Voltage **Continuous** **Transient**	**8** **6**	14 18	16 13	Volt
Power Good Output range	88		115	%
Under-voltage Shutdown	70	75	80	%
Over-voltage threshold	115	120	125	%
Operating Temperature	-20	25	60	°C
Storage Temperature	3A (see below)	4.5A (see below)		°C

Ignition Key Timing

For car use, the intelligent timing controller provides you a flexible setting for car PC system.

Parameter	Default	Min	Max	Unit
Auto Start signal to motherboard after ACC ON	Enable			
Start signal pulse width	300	400	500	MS
Delay time of Start signal after ACC ON	8	5	250	Second
Delay time of shut down signal after ACC OFF	30	5	250	Second
Delay time of shut down signal after low voltage detected	10	10	255	Second

Delay time of forced shutdown after shut down signal out		50		Second
Forced shutdown signal period	5	6	7	Second

Pin outs and Wiring
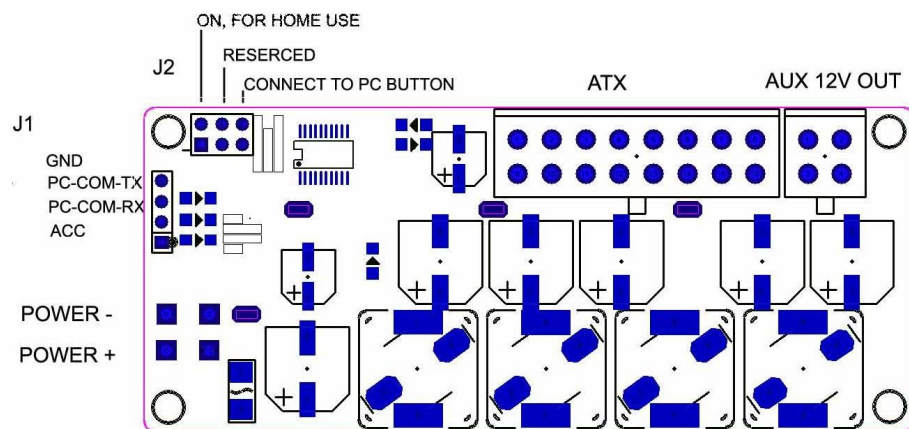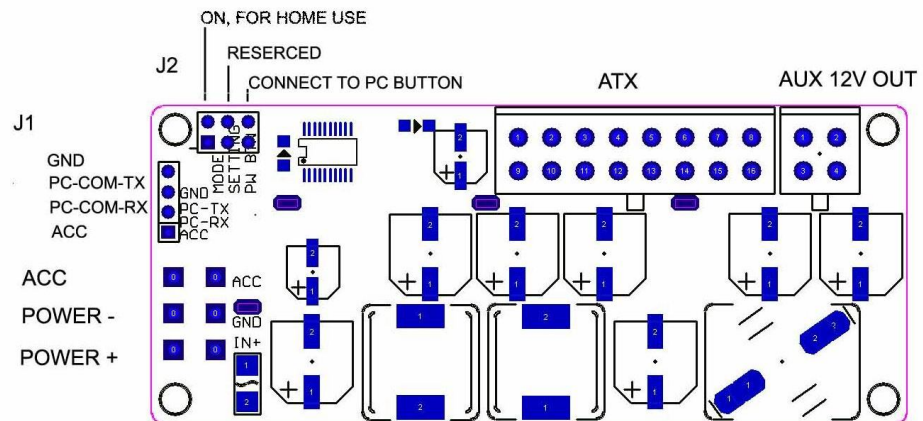
J1-1: ACC Signal

J1-2 COM-RX

J1-5: COM-TX

J1-4 GND

J2-1 & J2-2: Short for home use, 5VSB is output. Open for car use

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J2-3 & J2-4:  Reserved
J2-5 & J2-6:  Power On/Off pulse to motherboard
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J2 Pins:

J2-1	J2-2
J2-3	J2-4
J2-5	J2-6

J3 (ATX) Pins:

3.3V	-12V
3.3V	PS-ON
5V	PW-OK
5V	5VSB
GND	5V
GND	GND
GND	GND
12V	12V

J4 Pins:

12V	GND
12V	GND

Fusing Considerations

CAUTION: Although this power module is internally fused. An input line fuse is recommended.

Home Use Quick guide:

Short the J2-1 & J2-2 to make the TONO III in home use mode, connect the input wires of 12V+ and GND, the ATX power cable to motherboard, it is ready to power. This is convenient for test your system on desktop.

Connect the J1-4, J1-5, J1-6 to PC's RS232 socket to set the timing when you want to change the default setting, a 4pin-6pin head is ship for this. 4p head need to insert to RS232 socket, it just need to connect the 2,3 and 5 pin of RS232. Running the setting software at PC.

Car Use wiring guide:

For Car use:

GND is connected to Car chassis with wire more than 22AWG.

Power+ is connected to battery 12 positive end (No switching, fused)

Connecting the ACC (ignition key) wire to your car's ignition key, please contact your car supplier to locate this wire.

Connecting ATX cable and HDD cable.

Connecting On/Off signal to motherboard with a 2 wires 2p-2p cable.

Operation guide:

1, when ignition key is off, 5VSB is off to prevent the motherboard discharge the battery, it consumes about more than 50 MA current from battery. It can exhaust your battery at few days. The whole power module consumes only 100UA at this idle mode(TONO III, TONO II except)

2, When ignition key is on for the first time, the MCU is wake up, and drive the 5VCB to output.

3, After a Delay time of Auto-Start signal, (if the Auto-Start signal out is set (default), and the jumper is on at J2-3&J2-4, and J2-7&J2-8 is connected to motherboard's power button). a pulse signal is sent to motherboard, it will signal the motherboard to power up. The default time is 10s.
If you do not connected the On/Off signal to motherboard, the signal still been sent. The PSU is also ready for power by waiting the PS_ON signal in ATX connector.

4, When motherboard pull down the PS_ON signal in ATX, the PSU is power up.

5, After power up, the MCU is now monitoring the power low status, and ACC status. If a lower power set point is reached and last for a setting delay time (default 10s), it will send the On/Off signal to inform motherboard to shutdown. Also, If a ACC OFF is detected, MCU will counts a setting delay time (default 30s), MCU send the On/Off signal to inform motherboard to shutdown.
(If the ACC OFF and Lower Power occurs but not continues, the count is cleared.)
In both case, if the motherboard is not shutdown in time (40second after On/Off signal is sent), MCU send the signal again, and counts for 50 second, within this time , if the motherboard shutdown the power, the PSU return to idle state. If not, at the end of this Forced Shut Down period, a forced shut down signal of long time OFF signal is sent, and then PSU is shut off entirely.

6, If a Auto Start signal is sent to motherboard, and then the PSU power up, worked and shutdown, it will not auto start again unless the ignition key is off for more than 50 seconds, it is to avoid the system is power up so frequently.

7, If any false occurs in power up, work or shutdown period, such as short circuit, over voltage and so on, the power is shut down and latched off. Recovery from latched shutdown is accomplished by turn the ignitions key off for at least 5 second.

Timing Setting Guide:

By connecting the PSU to a PC with RS232, with software like HyperTerminal, with the following setting:

1200, 8, N, 1

The timing of PSU can be set as the following command sets:

(All in Hexadecimal value)

E000H: Get the all setting value:

Byte 1:

b0: Set: Auto Start Signal enabled, clear: disable.

Byte 2: A flag byte always be 0x68,

Byte 3: Delay time of Auto Start signal after ACC ON.

Byte 4: Delay time of Shut Down signal after ACC OFF.

Byte 5: Delay time of Auto Start enable again after ACC OFF.

Byte 6: Power Low Detected level, from 0 to 40, represent 10V to 13V.

Byte 7: Delay time Shut Down signal after Power low level reached.

Byte 8: Reserved.

E001H: Get the PSU status value.

E002H: Send a Power ON signal to motherboard.

E003H: Send a Power ON signal to motherboard.

E00FH: Recall all setting.

E1xxH: Set the setting byte 1 value.

E2xxH: Set the Delay time of Auto Start signal out after ACC ON.

E3xxH: Set the Delay time of Shut Down signal out after ACC OFF.

E4xxH: Set the Delay time of Auto Start signal out enable again after ACC OFF

E5xxH: Set Power Low Detected level, from 0 to 40, represent 10V to 13V, 0.075V per step.

E6xxH: Set Delay time of Shut Down signal out after Power low level reached.

Outline Diagram

Dimensions are in millimeters and (inches).

Tolerances: x.x mm ± 0.5 mm (x.xx in. ± 0.02 in.),

x.xx mm ± 0.25 mm (x.xxx in. ± 0.010 in.)

Dimensions

(3.74in x 1.55in x 0.63in)

(95MMx40MM*15mm) (The Height size not include the plastic connector)

Top View

Weight

130 grams

Warranty

1 Year Limited Warranty statement.