



MPC- ITX-12

ITX PC CASE



Brief Description

OPUS Solutions, Inc. ITX Mobile-PC Case is the perfect low power, high performance automotive PC solution.

- A fully featured ITX PC Case.
- Twin PCI slots
- Additional USB and Fire wire port ready.
- Built-in intelligent DC-DC vehicle power supply with auto shutdown.
- Optional case shock & vibration protection mounts available.

Full Description

Opus Solutions ITX Mobile-PC Case is designed, specifically, to be used in an automotive environment. This Product brings a new dimension to your PC's mobility and size. Just get in your vehicle and start the engine; your PC is ready to go. When you switch off the ignition the PC can go into shut down, standby or hibernate modes automatically, no switch to fiddle or fuss.

The Mobile-PC Case enjoys the wide selection of hardware and software available for the PC platform. Thus, the Mobile-PC Case is an ideal choice for a fully expandable computer at a reasonable system cost. The system can be upgraded, when required, without losing all the initial investment, unlike laptops.

The Mobile-PC Case is equipped with a DC-DC Power supply, which has a micro-controller that controls and monitors various functions of the power supply operation. It monitors automobile battery voltage to protect against deep discharge. The Ignition lead is monitored to start the Mobile-PC when the ignition is turned on and to implement a safe shutdown procedure. It controls and monitors motherboard signals to provide smooth power-up and power down sequences. In addition, it also responds to shut down, stand-by and hibernate modes. The power supply can be programmed to shut down the PC after a delay of up to one hour. The power supply outputs are monitored to assure proper PC operation. A green LED indicator in the power supply continually reports the power system status and health. It is also used for troubleshooting.

There are features that are built-in for trouble free and safe PC operation. The input power is protected against transients, load dumps and double battery during jumpstarts. PC does not reboot during engine start or cranking. It also uses state-of-the-art technologies and the most advanced techniques to maximize efficiency, performance and reliability. Simply put, there is no other PC with a power supply like it.

The ITX Mobile-PC Case features:

- Twin PCI slots (Riser card included)
- Designed for a mini-ITX motherboard (MII10000 or equivalent)
- Additional IEEE 1394 firewire and USB port ready
- 2.5" Mobile HDD Adapter (3.5" HDD Bracket available)
- 12V-90W power supply (24V-90W unit available)
- Dimensions: W 13.5" x L 9.25" x H 2.9"
- Optional case shock & vibration protection mounts available.

Screw / Cable Kit & Hardware Designator

1.	ITX Case	(Qty: 1)
2.	Riser Bracket	(Qty: 1) Pre-Installed
3.	Riser Bracket screw	(Qty: 1) size: 4-40 x 3/8" Pre-Installed
4.	90W Power Supply	(Qty: 1) Pre-Installed
5.	90W Power Supply screws	(Qty: 5) size: 4-40 x 1/4" Pre-Installed
6.	Thermal Pad (installed on PSU)	(Qty: 1) Pre-Installed
7.	DCX3. Cable Kit	(Qty: 1) Pre-Installed
8.	2.5" HDD Adapter	(Qty: 1) Pre-Installed
9.	2.5" HDD Adapter screws	(Qty: 4) size: 4-40 x 1/4" Pre-Installed
10.	HDD Screws	(Qty: 6) size: M3 x 5mm Included in kit Bag
11.	PCI Riser Card	(Qty: 1) Pre-Installed
12.	PCI Riser Card screws	(Qty: 2) size: 4-40 x 1/4" Pre- Installed
13.	CD-Rom Bracket	(Qty: 1)
14.	CD-Rom Bracket Screws	(Qty: 4) size: 4-40 x 1/8" included in kit bag
15.	CD-Rom side mount screws	(Qty: 4) size: M2 x 3mm included in kit bag
16.	CD-Rom Bracket Washers	(Qty: 4) size: .169x404x.032 Pre-Installed
17.	I/O Brackets	(Qty: 3) Pre-Installed
	I/O Bracket screws 1 st & 2 nd	(Qty: 2) size: 6-32 x 3/16" Pre-Installed
	I/O Bracket screw 3 rd	(Qty: 1) size: 4-40 x 3/16" Pre-Installed
18.	I/O Bracket cover	(Qty: 1) size: 4-40 x 3/16" Pre-Installed
19.	ITX Case Cover	(Qty: 1)
20.	ITX Case Cover screws	(Qty: 11) size: 4-40 x 1/4" 4 pcs Pre-Installed (black screws)
21.	ITX Case Cover screws	(Qty: 2) size: 4-40 x 3/16" Pre-Installed (side cover screws)
22.	Internal Fan	(Qty: 1) 60mm x 15mm Pre-Installed
23.	Internal Fan screws	(Qty: 4) 4-40 x 1 1/8" Pre-Installed
24.	Fan Filter	(Qty: 1) Pre-Installed
25.	Fan Filter Cover	(Qty: 1) Pre-Installed
26.	Thumb Nuts (Fan)	(Qty: 4) 4-40 Knurled Brass Nuts Pre-Installed
27.	Mounting Brackets	(Qty: 2) Included in kit Bag
28.	Mounting Bracket screws	(Qty: 6) size: 6-32 x 3/16" Included in kit bag
29.	Motherboard Screws	(Qty: 6) size: 6-32 x 3/8" Included in kit bag
30.	Jumper	(Qty: 1) Jumper for PSU Included in kit bag
31.	Remote Trigger Cable	(Qty: 1) Included in kit bag
32.	Tie Straps	(Qty: 6) Included in kit bag
33.	Power Cable for PSU	(Qty: 1) Included in kit bag
34.	Power Switch Cable	(Qty: 1) Green & White wire Included in kit bag

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DC-DC 90W Power Supply

General Information

Power input

Powered by 12Volt battery systems. The Computer on and off sequence is determined by the state of ignition/switch input. The DCX3.1209 power supply is compatible with ATX/SFX power specification.

Normal operating condition

When the computer is properly assembled, cabled, configured and power applied to the DC-DC power supply it should function as described below.

Idle state (ignition off):

In an idle (ignition off) condition, the Status Green LED light in the power supply will blink for 100ms ON and OFF for approximately 2.5 sec. The PC is powered down. Only standby power is supplied to the motherboard. The power consumption should be at very minimum. (The idle state power consumption varies depending on the motherboard manufacturer, bios setup, amount of memory modules installed and other hardware installed).

PC ON State:

When the ignition switch is turned on the Status LED light will be ON constantly within 9 seconds. This indicates that proper handshakes and controls were accomplished between DC-DC power supply and the motherboard, and they are operating normally. The operating system should be booting, coming out of standby or hibernate mode. The PC is ready for your use.

Back to Idle state:

When the ignition switch is turned off, The DC-DC power supply will delay going into shut down, stand-by or hibernate modes.

The delay time is set by a jumper located on the narrow side the DC-DC power supply (Refer to the heading 'Setting the turn off delay'). Once the delay time has elapsed, the DC-DC power supply hand shakes and controls with the motherboard to go into one of three states namely shut down, standby or hibernate mode if supported by the motherboard.

If the ignition is turned on again, while shut down delay is in progress, the DC-DC power supply will turn off the delay function and the PC will continue operate normally. If the PC is manually put into stand-by mode, tapping the keyboard or pointing device will start the PC as long as Ignition is on and the mother board BIOS is setup for the this function. If the PC is manually put into power down mode, to restart the PC the ignition must be turned off for at least 5 sec and turned on again.

Abnormal condition:

If the green LED light flashes at a faster rate, this indicates a problem condition. Count the number of flashes and refer to trouble shooting section to determine the nature of the fault.

Battery management:

The normal full load operating voltage range of the power supply hardware is between 7.5V to 18VDC. However, if the battery voltage dips below the set low battery voltage level for more than 10 sec. Continually the micro controller in the DCX3.1209 smart power supply will go into shut down sequence. This prevents the battery from deep discharge, which may cause permanent damage or shorten life of the battery, and it is saved for its main intended purpose, to start the vehicle.

Stand-by power control:

A pair of pins on JU1 on the DC-DC power supply controls the Stand-by power to motherboard operation.

Jumper not installed: The stand by power is turned off immediately after shut down sequence. In this setup, the computer system can only go into power down or hibernate mode but CANNOT go into stand-by mode. The power drain on the battery will be the minimum, less than 0.25W.

Jumper installed: The stand-by power is maintained after shut down sequence. If the battery voltage dips below the low battery voltage limit during idle state of the computer system, the stand-by

power will be turned off to protect the battery. It is also turned off if an error condition is detected during shut down sequence. In this set up the computer system can go into power down or stand-by modes. The power drain on the battery is determined by the motherboard make and model, I/O devices that are enabled for stand-by, amount of memory, etc. The power drain on the battery can be between 1 to 8Watts.

Power-up on interrupt:

The computer system can be powered up by an interrupt source without ignition or On/Off input being enabled. In this mode the computer system will go into shut down sequence 20 minutes after interrupt wake up or power up. This mode of operation is useful if you need to wakeup the computer system for software updates, up or down loading files from the vehicle computer system over wireless network without physically turning on the ignition or ON/OFF input to the vehicle computer system.

REMOTE TRIGGER OUTPUT

Remote/ Trigger output (optional)

The remote/trigger output can supply raw switched battery to turn-on slave device. This out can be used to turn on such devices as LCD monitors, Head units, Amplifiers, external DVD-ROMs, etc. It is intended to control remote inputs of above mentioned slave devices and NOT intended to power directly by the remote output of the DC-DC. If a slave device does not have remote input then a relay or such devices must be used to switch power to the Slave devices, and the relay can be controlled directly by the remote output of the DC-DC. A clamping diode must be used across the relay to suppress back EMF.

General wiring guidelines

Connect the computer power input cable directly to the battery terminal through a 10A or 15A fuse.
Use half loop to prevent cable/connector stress.

Use a dedicated #12 AWG or thicker cable to connect the unit to the battery.

Use an #18 AWG wire for ignition or on/off

Note: Do not share power cable with other equipment/s.

Make sure the voltage at Input power connector of the DC-DC (across pin 1 and pin 2) is less than 0.5V drop than the voltage at the battery, with the computer operating at full load. If the voltage drop is greater then 0.5V then use thicker cable for the battery and Ground connections.

Input Power connector

Connector pin description

3 2 1
0 0 0
I - +

View of connector used on the power supply.

Mating Plug: AMP; P/N: 350766-1

Crimps: Amp P/N: AMP; 640310-3 qty 2 and 350919-3 qty 1

<i>Pin#</i>	<i>Label</i>	<i>Function</i>
1	Batt (+)	+12V Battery power feed - Red
2	GND (-)	Battery return (GND) - Blk
3	IGN/SW	Ignition or power switch input - Yell

Shut Down Delay Time and Stand-by Power mode Jumpers

A four-pin jumper block (JU1) is located on top left corner of the DC-DC power supply.

Jumper configuration



__ Shut down delay select; Jumper Not installed = 10 Sec shut down delay

\\ Jumper Installed = 20 min. Shut down delay



__ Stand-by power mode select; Jumper Not Installed = Stand-by power OFF after ign is OFF

Jumper Installed (factory default) = Stand-by power maintained after Ign is OFF

Configuring VIA EPIA-M Series ITX motherboard BIOS

1. Power-up the computer and press the 'Del' key to go into the 'BIOS SETUP UTILITY'
2. Go to the 'Power Management Setup'. Use arrow keys to navigate and enter.
3. ACPI Function - Enabled
4. ACPI Suspend Type - S3 or S1&S3
5. Power Off by Power Button - Instant-off
6. Run VGA BIOS if S3 resume - Auto
7. AC loss auto restart - OFF
8. Go to 'Peripheral Activity'
9. PS2KB wakeup select - Hotkey
10. PS2KB wakeup from suspend - Cntrl+F1 or whatever is your preference
11. Type 'Esc' to go back to 'Power Management Setup'
12. Type 'Esc' to go back to top level of BIOS setup menu.
13. Select 'Save and Exit setup'; Type Enter, Y, Enter.
VIA EPIA-M ITX motherboard configuration is complete.

Wiring Your ITX POWER SUPPLY to Battery

Refer to application example drawing.

1. Connect the bottom end of 20-pin ATX power cable Y cable to OPUS DC-DC power supply J7 –ATX/ITX Power Connector. Connect the 20-pin connector end to a Power connector on the ATX/ITX motherboard.
2. Connect the 4-pin drive power cable end to the appropriate Drives.
3. Connect the 2-pin cable (polarized side) to J5- (Power-switch) of DC-DC power supply. Connect the other end to the motherboard 2 pin ITX power switch/soft power switch pins on the F_Panel header.
Important: proper polarity is required to function accurately. The green wire side of the 2-pin connector must be connected to the +ve side and white wire side must be connected to the – ve side of pins.
VIA, EPIA-M ITX motherboard: F-Panel header Pin 6 is +ve (green wire side) and pin 8 is –ve (white wire side). Refer to motherboard user guide.
Intel D815EEA2 motherboard: Front panel header Pin 6 is +ve (green wire side) and pin 8 is –ve (white wire side). Refer to motherboard user guide.
4. Wire the 3 pins DC input power connector.
Pin 1: Battery Positive. Use RED color # 12 AWG automotive grade wire.
Pin 2: Ground or Battery Negative. Use Black color # 12 AWG automotive grade wire.
Pin 3: Ignition or Switched Battery. Use Yellow #18 AWG automotive grade wire
5. Insert the 3 pin input power cable connector to OPUS DC-DC power supply input power connector.
6. Double-check all wiring for proper connection, power feed and battery polarity to the power supply.
7. If the power feed to the power supply/ PC is connected properly, Status Green LED in the OPUS DC-DC power supply should blink at a rate of approximately .1 sec. ON and 2.5 sec OFF. This is the idle /standby state of power supply.

Testing the PC with DC-DC Power supply installed

1. Power-up the computer by Turning the Ignition switch on (starting the vehicle) or toggling the switch. The Green Status LED should light up constantly and the computer should power up normally.
2. Open any application and test for normal operation, then close the application.
3. Turn off the computer by turning the ignition switch off. Within 5 Sec. the PC should start to go into Standby or shut down mode and the Green status light should go back to the idle/standby blink rate.
4. Wait about 10 seconds and Turn on the Ignition switch again. The computer should power up normally.
5. Open an application for Standby mode testing. Use the application as you would normally.
6. Turn off the computer by turning the ignition switch off. The computer should go into Standby or shut down mode, as it was set in step 4 of configuring your operating system (Windows 98 SE). See note below.
7. Repeat steps 4 to 6 for all applications that are used in your computer.

Trouble shooting guide

Computer does not turn on?

Check to make sure that battery is connected to DC-DC Power supply connector.

Check to make sure that Ignition input to DC-DC power supply is connected to pin 3 of the power input connector.

Make sure the 2-pin power switch pins are properly attached.

Computer does not turn off when the ignition is turned off!

Check the Green LED state

Interpreting the Green Status LED light flashing

0.1 sec ON and 3.5 Sec OFF Approx.: DC-DC power supply is in Idle or stand-by state.

On constantly The PC is powered and the PC should be operating.

Number of flashes Reason for flashing

1 Flash Battery voltage is below normal operating range.

The normal range is 10.6 VDC to 18 VDC.

During engine cranking the low battery voltage detection is ignored so the battery voltage can dip below 10.6V.

2 Flashes the computer power up sequence failed

Reasons:

1. Check the wiring of the two wire power-switch cable from power supply connector J9 to power switch pins on the ATX motherboard. If connected properly check the polarity of the power switch pins. May be reversed.
2. Check ATX motherboard bios settings.
3. Locked up motherboard or software crash of bug.
4. Faulty DC-DC power supply.

3 Flashes Power supply output voltages are out of normal voltage range.

Reasons:

1. Power supply output is over loaded or shorted.
2. Faulty DC-DC power supply.

4 Flashes Power down, stand-by or hibernate sequence failed.

Reasons:

1. Check the wiring of the two wire power-switch cable from power supply connector J9 to power switch pins on the ATX motherboard. If connected properly check the polarity of the power switch pins. May be reversed.
2. Check ATX motherboard bios settings.
3. Check if ACPI function is enabled in the power management BIOS setup.
4. Make sure ACPI drivers are installed in the operating system.
5. Check if application is compatible with ACPI mode of operation.
6. Locked up motherboard or software crash of bug.
7. Faulty DC-DC power supply

