

Product Manual

PSU-PC12

Intelligent Power Supply Unit



12.2 Environmental humidity

*Working humidity: 10% to 90% (w/o condensation)

*Storage humidity: 5 ~ 95% (w/o condensation)

12.3 Altitude

*Working Altitude: 10,000 H.

*Storage Altitude: 20,000 H.

12.4 Cooling

*Natural Fan-less cooling

13.0 Reliability

Average Working hours MTBF 10,000 hours

10.1.6 Shutdown Sequence State

At the beginning of this state the SSC issues an ACPI strobe to the motherboard via the ACPI Power Switch connector with Green/Black wires. After the ACPI strobe is sent the SSC enters a Shutdown Lockout time period, in which the SSC prevents the PSU from being turned on. This is to prevent the SSC from issuing multiple ACPI strobes to the car PC the SSC re-enters the Idle State and waits for the ignition switch to be turned on.

10.1.7 Forced Shutdown State

If the SSC detects either 1 a low battery (<9volts for >30seconds), an Over Current condition, the SSC enters a Forced Shutdown state. During this state the SSC immediately begins a Shutdown Sequence without first entering the Shutdown Delay State. The Shutdown Sequence cannot be exited by turning on (or leaving on) the ignition. After a Forced Shutdown State is completed, the ignition switch must be turned off to unlock the state and re-start the car PC.

11.0 Safety Compliance

Power should be consistent with the FCC / E8 Certification.

12.0 Working environment

12.1 Ambient temperature

- * Operating temperature: -10°C ~70°C (14°F~158°F)
- * Storage temperature: -20°C ~80°C (-4°F~176°F)

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1.0 Electrical Specification:

1.1 Input features

Input voltage range	9VDC~36VDC
Full load input current	< 16A
Efficiency	80%min Full load

1.2 Technical Note :

1.2.1. DC Voltage input range : 9V ~ 36V

1.2.2. Total power output : 95 Watt

1.2.3. Main power supply output: DC +12.3V /6.5A Over-ampere (80 watts)

Secondary power output: DC +5 V / 3A amp (80 watts)

Input supply voltage and current requirements : 9~36V / 10~16A

1.2.4. A set of internal transfer (9~36V/2A) Output, ACPI control interface

1.2.5. PSU-PC12 handling of startup / shutdown : ①.Controlling of voltage pulse through remote to control power on or power off; ②.When ACC is ON, the start up of PC will be delayed for 3 seconds thus preventing the popping sound coming from an external amplifier; ③.The use of remote-controlled car boot: The PSU will automatically shut down the PC if it does not receive an ACC on signal after 2 minutes.

1.2.6. Low-voltage battery monitoring to prevent depletion of battery: The PSU-PC12 will issue a warning light if the PSU detects that the input voltage has dropped below 9V during the boot process. PSU will issue a shutdown command to the PC if the input voltage doesn't rise above 9V within 30 seconds. When the input power rose back to more than 9V while the ACC is still on, the PSU will start up the computer again automatically.

10.1.3 Bootup Lockout State

After the car PC is powered, the ACPI strobe is sent to the motherboard via the ACPI Power Switch connector with Green/Black wires. At this point the SSC enters a "Lockout" state. In this state the SSC will not allow the PSU to be turned off until after a Lockout Time period. This state is designed to prevent damage or corruption of a user's hard drive during bootup or shutdown by premature loss of power.

10.1.4 Run State

After the Lockout period ends, the SSC enters the Run state. During this time your car PC is running normally and the SSC continues to monitor your car battery, and the output current. If the battery dips below approximately 9volts for more than 30 seconds, or if the user is drawing more than the specified maximum output current, the SSC enters a "ForcedShutdown" state (described below). Under normal conditions, you exit the Run State either by turning off the ignition switch or with a remotely applied pulse. After normally exiting the Run State, the SSC enters the Shutdown Delay State.

10.1.5 Shutdown Delay State

After you turn off your ignition, or apply a remote pulse, the SSC enters a Shutdown Delay state. This state allows you to keep your car PC running for 5 seconds after the ignition is turned off. During this Shutdown Delay State, turning the ignition switch back on will cause the SSC to re-enter the Run State and cancel the shutdown sequence. Also, a remotely applied pulse can either prolong the Shutdown Delay State, or send the PSU immediately into Shutdown Sequence State.

9.2.6 Ignition Override

If, after the PSU has been started by a pulse, the Ignition is turned on, control is passed to the Ignition line. Once the Ignition line has gained control of the SSC it will be able to shutdown the PSU as if it had initially started it. This feature is useful when you wish to remotely start the car PC with your wireless device, but then get into your car and drive.

10.0 PSU-PC12 Startup/Shutdown Controller

The PSU-PC12 includes an intelligent, microprocessor-based startup/shutdown controller. The PSU-PC12 Startup/Shutdown Controller (SSC) provides safe, reliable control over your car PC's bootup and shutdown processes. The main concerns of the SSC are protecting your hard drive from corruption, protecting your car battery from being discharged, and protecting the PSU from overheating.

10.1 SSC Operation States

10.1.1 Idle State

While idle, the SSC monitors your car battery while waiting for the ignition switch to be turned on. If the battery is below approximately 9 volts, the SSC will not allow the car PC to boot. If the battery is above 9 volts, the SSC will allow the car PC to boot normally.

10.1.2 RunDelay State

When you turn on your ignition, the SSC briefly (approx. 3 seconds) enters the RunDelay state. During this time the SSC checks to make sure the battery is stable, the ignition stays on, and then turns on its PSU output to the car PC.

1.2.7. Handling of sudden voltage drop: This PSU can handle a sudden voltage drop to 7V~9V for up to 30 seconds. However, the voltage will have to climb back to more than 9V within 30 second or else the PSU will tell the computer to shut-down automatically.

1.2.8. Solid aluminum alloy casing and chassis which provides an excellent thermal design for automotive environment

1.2.9. External fuse: an user-friendly replacement fuse to protect your car from internal short-circuit of power

1.2.10. Outside dimension : 112x112x48mm (4.4"x4.4"x1.9")

1.2.11. Weight : 0.55Kg (1.21lb)

1.3 Output characteristics

1.3.1 Output ratings

Output voltage	Rate adjustment	Rated current
5V	5V±5%	3A
12V	12V±5%	6.5A
=Vin(Internal transit)		2A

1.3.2 Output ripple and noise

Output voltage	Ripple and noise (Maximum)
5V	50mVp-p@25°C; 100mVp-p@-10°C
12V	120mVp-p@25°C; 200mVp-p@-10°C

Note: 1) the oscilloscope is set at 20 MHz bandwidth.

2) parallel output to the 0.1uF ceramic capacitor and the 10uF electrolytic capacitor to simulate the load.

2.0 PSU-PC12 power and the application of internal jumper

2.1 Before your start

Please take the time to read the instructions carefully before installation. ThePSU-PC12 is an advanced intelligent power supply unit which is microprocessor-controlled. Settings can be made through the built-in jumpers to meet your specific needs.

2.2 Making the settings

In the follow page is a location diagram of the jumpers. You will need to remove the screws on the top casing, and then carefully remove the top casing from the PSU. Please re-attach the top casing once you are done changing the jumpers.

2.3 Power output logic boot sequence, LED status indicators, and jumper settings:

Jumper	Functions
CN6	Pulse Start Input
	Power Shutdown Delay Time
	Power Output Sequence
JP1	+5V Always On Jumper
S1	+5V Secondary Output Control

9.2.2 Starting the PSU with a pulse

When the PSU is in Idle State (both LEDs off) and an externally applied pulse is applied to the blue input wire labeled PULS, the PSU will power up normally, as it would if the Ignition line had gone high. During the Bootup Lockout State any input pulse is ignored.

9.2.3 Stopping the PSU with a pulse

After the normal power up sequence, and while in Runs State, the SSC monitors the Pulse Start input for a shutdown pulse. If a single shutdown pulse is sensed, the PSU goes into the Shutdown Delay State. However, if control has been passed to the Ignition line (see Ignition Override below) the Pulse Start input is ignored.

9.2.4 Prolonging the Shutdown Delay State

If, while in the Shutdown Delay State, a single pulse is detected, the Shutdown Delay is restarted at its original value in order to prolong the Shutdown Delay. This is useful for occasionally downloading large files that would take longer than the normal Shutdown Delay time.

Once the Shutdown Delay has timed out, the PSU enters the Shutdown Lockout State. At this point the SSC ignores any pulse input until the PSU enters the Idle State.

9.2.5 Shutting down the PSU with double pulses

If two pulses are detected within a 5 second window during the Shutdown Delay State the PSU will skip any remaining Shutdown Delay Time and immediately enter the Shutdown Lockout Sequence. This feature is useful for shutting down the car PC when your file transfer process is completed.

9.0 Using the Pulse Start Feature

The PSU-PC12 includes a feature that allows you to remotely start and stop the PSU. This feature is called "Pulse Start". This feature would normally be used in conjunction with a wireless device such as a car alarm with auxiliary inputs/ outputs or a WiFi device with Wake-On-LAN (WOL) features.

9.1 Pulse Start Connections

The Pulse Start input can be an externally applied voltage (ie +5v or +12V) pulse. The externally applied voltage pulse is connected to the Blue **Input** wire labeled **PULS**. You can use this wire to start/stop the PSU.

9.2 Pulse Start Operation

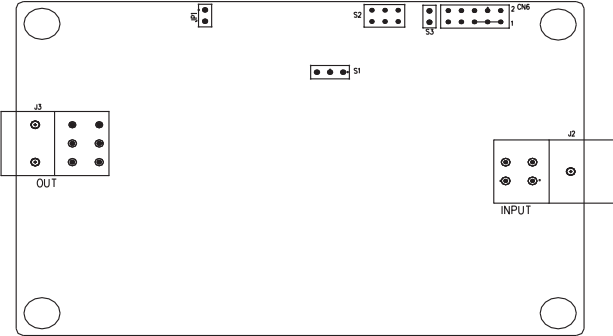
9.2.1 What is a pulse?

When connecting to the blue input wire labeled PULS, the "pulse" must be a voltage that transitions from 0V to +V, and then transitions back to 0V. The SSC will wait (hang) if the voltage stays high without going back to 0V after the initial transition from 0V to +V.

The value of the +V can be any voltage from approximately +2V to +20V. Typical voltages are +5V or +12V. The value of 0V must be below +2V or open circuit (ie you could drive this input with a relay that momentarily connects to a +12V source and then provides an open circuit). The current required to drive this input is very low (milliamps).

Pulse Width

The pulse width can be any value from a minimum of approximately 100mSec to several seconds. As mentioned above, if the pulse is very long the SSC will wait for the transition back to the normal state before continuing.



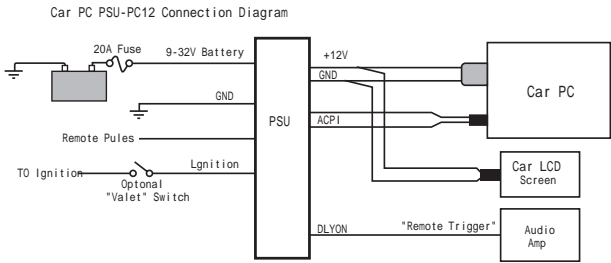
Location diagram

2.4 CN6 Jumper Settings

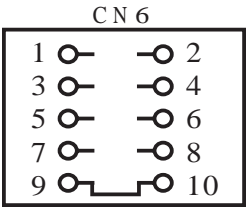
Below is a table with the jumper selectable options for CN6. To move a jumper from its factory default (open) position, use a pair of tweezers or needle nose pliers. Be careful to place the jumper in the correct position or erratic behavior could result. Double-check your settings before replacing the PSU casing.

Connect the LCD monitor power cable to the PSU-PC12 Primary Output

Here you have two options: 1) Cut off the Xenarc LCD monitor cigarette adapter and splice the screen power cable into the PSU-PC12 Primary Output. Or 2) Purchase the optional Monitor Power Cable and splice it into the Primary Output of the PSU-PC12. The Primary Output of the PSU-PC12 appears on the RED wire of the powercable. You should connect this RED Primary Output to the "+" (positive) lead of your monitor power cable. The "-" (negative) lead of the monitor power cable should be splice into the BLACK ground wire of power cable. These connections are show in the picture below.



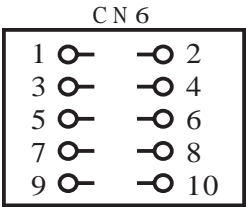
3.2 CN6 Pin 9-10 Jumpered



Upon ACC ON, the PSU-PC12 will turn on main +12.5V output first, then it'll turn on Secondary +5V output 6 seconds later, and then it'll turn on Remote Trigger output 7 seconds later. And then 3 seconds later, the PSU-PC12 will issue command to turn on the Car PC.

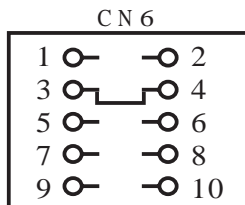
4.0 Setting the Power shutdown delay:

4.1 CN6 Pin 3-4 Open (Default)



Upon ACC OFF, the PSU-PC12 will wait 5 seconds, and then it will issue command to turn off the Car PC. 30 seconds later, it will shut off the 12V output. Then 3 seconds later, it will shut off the 5V output. And then after another second, it will turn off the Remote Trigger output.

4.2 CN6 Pin 3-4 Jumpered



Upon ACC OFF, the PSU-PC12 will wait 5 seconds, and then it will issue command to turn off the Car PC. 90 seconds later, it will shut off the 12V output. Then 3 seconds later, it will shut off the 5V output. And then after another second, it will turn off the Remote Trigger output.

5.0 Status LED Description

LED (D7/D9) State	Description
Both Off	Idle State. PSU is idle and waiting for ignition/accessory switch to be turned on. It is monitoring battery voltage during this time.
D7 and D9 Blinks, then D7 Off, D9 On by itself for 3sec, Both Off for 9sec, then Both On	PSU is in bootup state.
D7 and D9 both On	PSU in normal operation mode.
Only D9 Blinks	PSU in protection mode. It means either there is an overload or a short-circuit.
D7 and D9 Blinks at first, and then D9 off, and D7 continues to Blink.	Input Voltage has dropped below 9V. PSU will issue shut-down command to the Car PC if the voltage doesn't rise back over 9V within 30 seconds.
D7 and D9 both Blinks	PSU is in Shutdown state.

Step 6 – Connect the power cable from the PSU to the Xenarc Car PC

Once you have tested for the presence of the proper voltage on the power connector, insert both the Red/Black power connector and the Green/Black ACPI Power Switch connector into the Car PC as shown in the picture below. Please note that the ACPI Power Switch jack on the back of the Car PC looks like a head-phone jack. However, it is silver in color instead of gold and it doesn't have any marking. Please make sure that you plug the ACPI Power Switch connector to the silver color jack instead of the gold audio jack.



The system is now ready to be connected to the other system peripherals.

8.2 Optionally Connecting the Xenarc LCD Monitor

The Xenarc LCD monitor comes with a cigarette lighter power adapter so that it can be powered separately from the PSU-PC12. However, you can optionally use PSU-PC12 to provide +12V regulated power to both the Xenarc Car PC and the Xenarc LCD monitor. Below are the steps you should follow if you choose to do this. These steps assume that you have already installed the PSU-PC12/Xenarc Car PC using power cable outlined in the previous section.

Step 2 – Connect Ground to the PSU-PC12.

We recommend that you either run another wire directly to the battery, or connect directly to the car chassis for grounding the PSU-PC12. If you run a wire to the battery, make sure it is that same size as your +12V battery wire used in step 1. If you run a ground wire to the car's chassis, make sure to find a secure ground that is not corroded or painted and use the same size wire as your +12V battery wire used in step 1.

Step 3 – Install optional Valet Switch.

A simple SPST switch installed in series with the ignition wire will allow you to manually disable the PSU-PC12 so that it does not come on when the ignition is turned on. This is optional and for convenience only.

Step 4 – Connect the PSU-PC12 power cable

The PSU-PC12 includes a power cable for interconnecting the Xenarc Car PC and the PSU-PC12. Insert the cable into the J2 connector (white 6-pin Molex connector) of the PSU-PC12. Do not plug the other end of this cable into the Car PC yet.

Step 5 – Test the PSU-PC12 before connecting the Xenarc Car PC

It is recommended that you test the output of the PSU-PC12 before proceeding to the next steps. Turn on the ignition and measure the voltage on the center pin of the round power connector as shown in the diagram below. The voltage should read approximately +12.4 volts.

6.0 Protection

6.1 Output over-current protection

Output voltage	Over-current	Remarks
12.0V	$\geq 10A_{typ}^*$	The resumption of power supply

Note: * The test is over-current protection in the other rated load test.

6.2 Output short-circuit protection

Output voltage	Remarks
12.0V	The resumption of power supply

Note: * short-circuit protection test in the other rated load test.

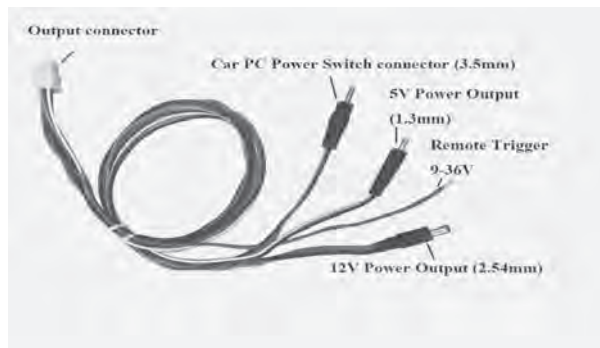
7.0 Wire description

7.1 The description of the Input line:



- ① Black is for connection to ground.
- ② Yellow is for connection to a 9~32V input power. This wire comes with a 32V/20A fuse.
- ③ Blue wire is for Pulse Start input.
- ④ Red wire is to connect to the car's ignition (ACC)

7.2 The description of the output line



- ① 2.54mm diameter plug with Red and Black wires connects directly to the Car PC's 12V power input. These wires have DC output voltage of +12V/6.5A
- ② 1.3mm plug with Black and White wires has DC output voltage of +5V/3A, for connection to devices such as a USB hub.
- ③ 3.5mm mini stereo plug with green and black wires connects to the silver color mini stereo jack remote power switch connector at the back of the Car PC.

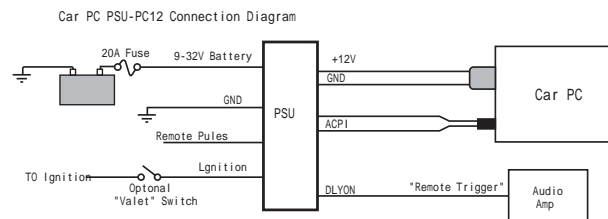
These wires control the ON/OFF switch of the Car PC.

- ④ Blue one-way transit wire with voltage output of 9-36V/2A for the remote triggering of an external audio amplifier. Please make sure this wire is insulated if not used to avoid short circuit.

8.0 Connecting the wires

8.1 Basic Connection

You can connect the input and output wiring harness after you have set the jumpers for the different options of the PSU-PC12. The steps outline below should be followed to insure proper operation of the PSU-PC12 and the Xenarc Car PC.



Step 1 – Connect the input power and ignition to the PSU-PC12.

Use heavy gauge wire directly connected to the battery (via 15A fuse and distribution block). 4-8 GA wire is recommended if the Car PC runs a 2-3GHz processor. 8-10 GA wire is recommended for lower speed processors. Using wire that is too small will cause the Car PC to not survive engine cranking.