

**PROPRIETARY INFORMATION**

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# CarNetix

**CarNetix CNX-P1280 DC-DC Power Supply**  
*(applies to Version 1.0+ hardware)*

**Installation and Operation Manual**

**Version 1.0**

**December11, 2004**

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## 1.0 CNX-P1280 Installation Instructions

*NOTE: This manual and feature set apply to Rev 1.0 and above of the printed circuit board (PCB). The PCB revision number is printed on the top of the PCB in white lettering. Please make sure you are using the correct manual for the correct product revision.*

### 1.2 Overview

The P1280 is a dual-output regulator with an onboard shutdown controller. It is designed to be used in conjunction with an existing DC-DC PSU that comes installed in a Mini-ITX case such as the Casetronic (Travla) C134 or C135 or the Morex 26XX/36XX series. The Primary Output of the P1280 is a +12V/60 watt regulated supply. The P1280 also includes a Secondary Output that can provide +5 Volts at up to 3Amps (15 Watts). The Secondary Output is intended to power +5V USB devices such as powered USB hubs or USB sound cards like the Audigy 2NX.

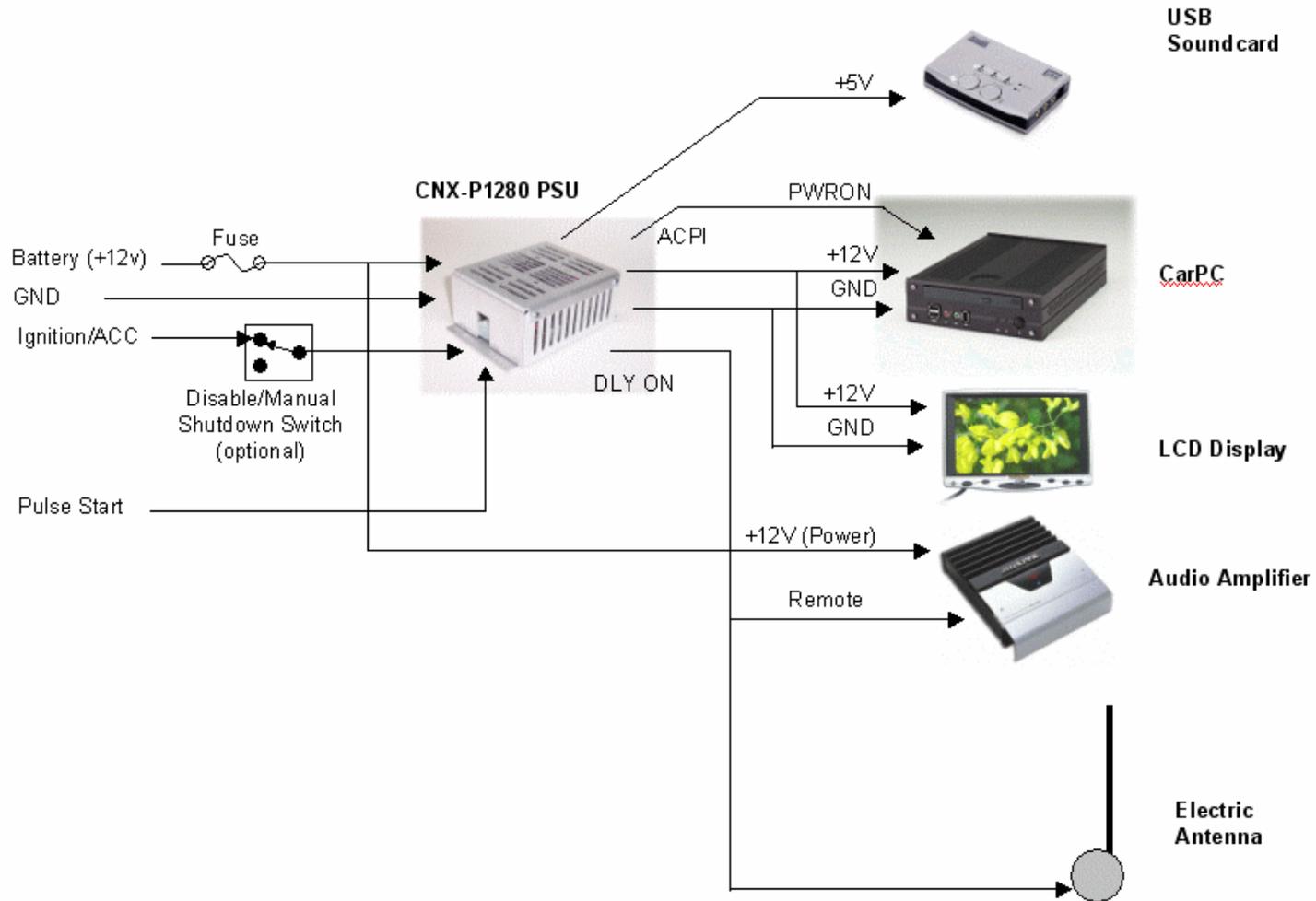
### 1.2 Before You Begin

Before you begin the installation, make sure you take the time to read through these instructions. The CNX-P1280 is a sophisticated, microprocessor-based device. If the proper installation steps are not followed, various types of problems could occur ranging from nuisance resets of your CarPC, to “Car-B-Que” (ie flames). Please read these instructions carefully and contact us either in our Support Forum ([www.carnetix.com/forum](http://www.carnetix.com/forum)) or via email ([support@carnetix.com](mailto:support@carnetix.com)) if you have any questions or problems.

It is assumed that you have a basic to advanced understanding of electronics. It would be helpful, and is highly recommended (especially if you plan to get much further involved in CarPCs) that you purchase, as a minimum, a simple VOM (volt-ohm meter) or DMM (Digital Multi-Meter). These devices are inexpensive (starting around \$20) and will save you and me a great deal of time. They can be purchase over the web or at your local retail electronics store (Radio Shack, Home Depot, some hardware stores, some auto parts stores).

Whether you plan to use the on-board Startup/Shutdown Controller (SSC) or not, please read the section describing its operation first, before attempting to install the CNX-P1280. The SSC will affect the power turn-on and turn-off operation whether you use its features or not.

# Typical Application



## 2.0 Installing Your CNX-P1280

Installing the CNX-P1280 involves 4 basic steps:

- Identifying the connection points:
- Setting the Jumpers:
- Connecting the wires:
- Turning on the system:

### 2.1 Identifying the connection points

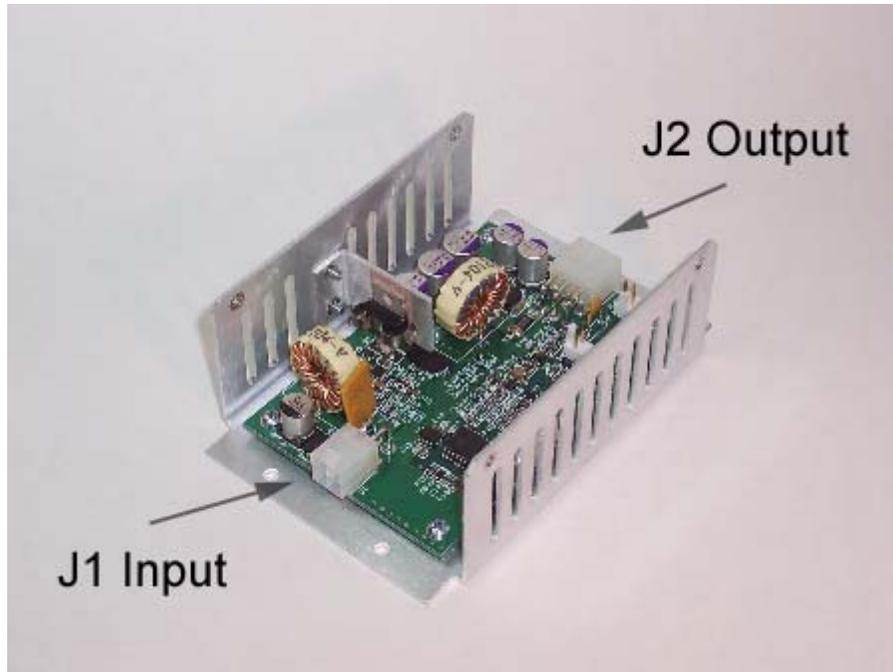
Figure 3 shows the location of J1 (Input connector) and J2 (Output connector). Note that J1 has 4 pins, while J2 has 6 pins. The pin connections/functions are as follows:

Pin	Wire Color	Function
1	Blue	Pulse Start Input (See Section 6)
2	Yellow	Ignition/ACC input
3	Black	Ground
4	Red	+12V Battery Input

Figure 1 J1 Input Connector Pinouts

Pin	Wire Color	Function
1	White	+5V Output
2	Black	ACPI Return (Ground)
3	Green	ACPI/PWRON
4	Red	+12V Output
5	Black	Ground
6	Blue	DLYON

Figure 2 J2 Output Connector Pinouts



**Figure 3 J1 and J2 Location**

## 2.2 Setting the Jumpers

*Note: Before adjusting the jumpers from their default positions, read the section on the SSC at the end of this document.*

There are 3 jumpers on the CNX-P1280. Below is a picture of their location on the board. You will need to remove the 4 screws that hold the lid, remove the lid, and disconnect the fan wire to get access the jumpers. Once you have selected your desired jumper position, replace the fan wire (note polarity of connector), replace the lid, and replace the 4 lid screws. Be careful not to let the fan wire touch the blades of the fan as your replace the lid.

Jumper	Functions
JP1	Pulse Start Input
	Shutdown Delay Time
	Hibernate/Standby
	Boot Time
	DelayOn Option
JP3	+5V Always On
JP4	Secondary Output Control

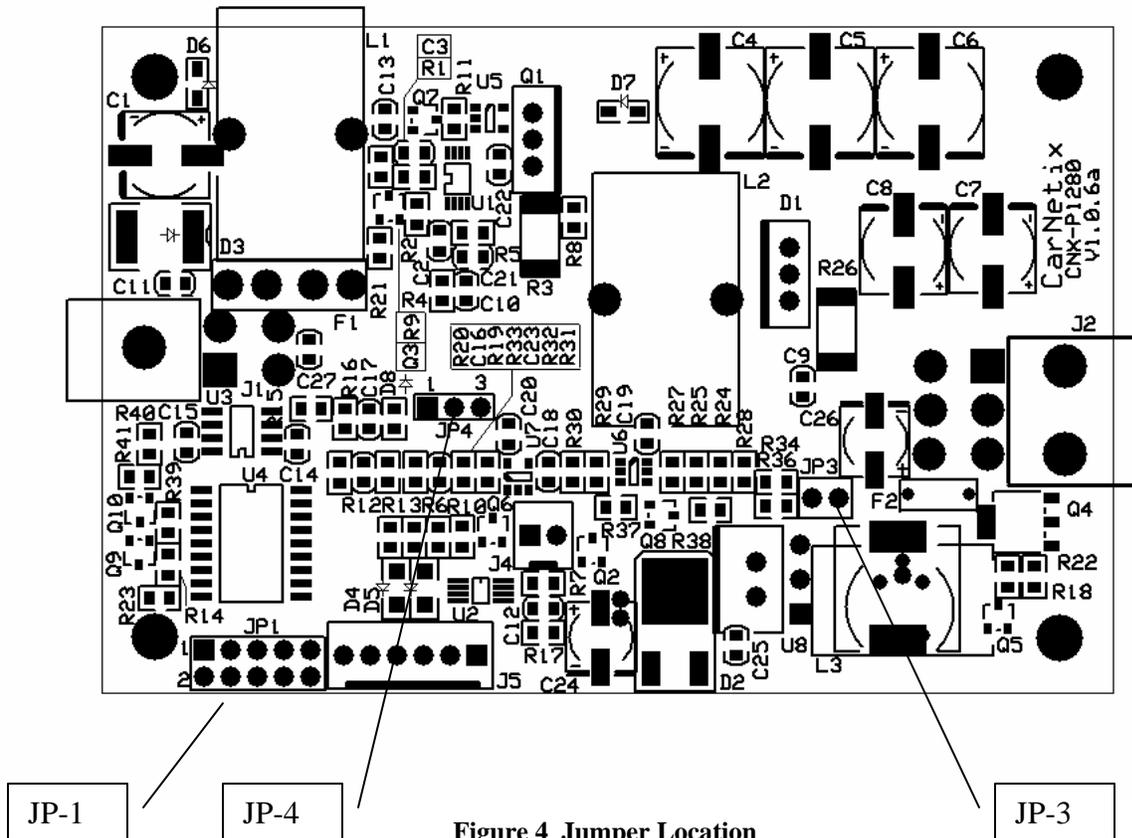


Figure 4 Jumper Location

## JP1 Jumper Settings

Below is a table with the jumper selectable options for JP1. To move a jumper from its factory default 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 lid.

JP1 Jumper Pin Assignments					
Pins					
	1-2	3-4	5-6	7-8	9-10
Function	Pulse Start Input	Shutdown Delay Time	Hibernate/ Standby	Boot Time	DelayOn Option
Open (default)	Connect to external contact closure	6 Seconds	Hibernate	30 seconds	DLYON follows IGN
Jumpered	Connect to external contact closure	15 minutes	Standby*	90 seconds	DLYON follows PSU

**Table 1 JP1 Settings**

**\*\*\* CAUTION \*\*\***

***\*Before selecting the Standby Mode (Pins 5&6) read section 7 (Hibernate/Standby Operations). IMPROPER USE OF THE STANDBY MODE COULD CAUSE YOUR P1280 TO OVERHEAT AND SELF-DESTRUCT OR CAUSE A FIRE IN YOUR CAR.***

Once the jumper selections have been made you may begin installing the wiring to connect the CNX-P1280 to your car's electrical system, and to your CarPC.

## JP3 Jumper Settings (+5V Always ON)

For those users who want to keep +5V USB devices powered even when the CarPC is OFF or in Standby, you can jumper Pin1 to Pin 2 on JP3. This will keep the +5V regulator ON at all times, even if the P1280 is OFF. Use caution when using this jumper position since it may cause your battery to drain quickly.

## JP4 Jumper Settings (Secondary Output Control)

The JP4 jumper gives you the flexibility to use the Secondary Output in different ways depending upon your CarPC system configuration. The Secondary Output can be turned on or off based on two different control signals: 1) DLYON or, 2) the signal that controls the Primary Output (PRI OUT).

- **DLYON**

Jumpering DLYON will turn your Secondary Output ON or OFF with the DLYON signal. This means that your Secondary Output will come on 3 seconds after your Primary Output comes ON, and will go off when you turn your ignition switch OFF.

- **PRI OUT**

Jumpering PRI OUT will make the Secondary Output follow the control used to turn ON and OFF the Primary Output. Thus, when the Primary Output is ON, the Secondary Output will also be ON. If the Primary Output is OFF, the Secondary Output will be OFF.

This setting is affected by the jumper setting of the Shutdown Delay jumper on JP1. If you have set the Shutdown Delay jumper to the default position (6 seconds), both the Primary and Secondary Outputs will be turned OFF 6 seconds after the Ignition is turned OFF. If you have set the Shutdown Delay jumper for 15 minutes, both the Primary and Secondary Outputs will remain ON for 15 minutes after the Ignition is turned off. This setting is useful for keeping certain USB devices powered during the Shutdown Delay time. For example, if you use the Secondary Output to power your USB sound card and you want to keep your sound card powered during the Shutdown Delay time (15minutes), then set the jumper JP4 for PRI OUT. Another application might be to keep a USB WiFi card powered during Shutdown Delay for file transfer.



Follows PRI OUT



Follows DLYON

## 2.3 Connecting the Wires

The CarNetix CNX-P1280 can be installed in a variety of ways, depending upon the system requirements. The primary target CarPC for the CNX-P1280 are the Casetronic (Travla) C13X series and the Cubid 26XX and 36XX series, with an internal Morex 60 Watt DC-DC PSU. The Morex PSU requires an input of +12V +/-5%, which is provided by Primary Output of the CNX-P1280. The +5V Secondary Output is typically used to provide power to USB devices.

In addition, the CNX-P1280 includes an on-board Startup/Shutdown Controller (SSC) which may be used if desired, but which is NOT required if all you want is power for your CarPC. The CNX-P1280 also provides a delayed control signal to turn on auxiliary devices such as audio amplifiers, after power has been applied to your CarPC. This helps prevent an audible “thump” in your speakers when power is applied to both the CarPC and the audio amp at the same time.

Three different installation configurations are presented here. They are specific to the C134, but the same techniques apply to other CarPC cases. If you have questions regarding a different type of CarPC that is not addressed here, please visit our Support Forum and ask the specific question there.

### Power Connection Options:

- 1) **Option 1:** Power-only to CarPC through existing case power plug.
  - Does not use the SSC (Startup/Shutdown Controller) and does not require opening the case
- 2) **Option 2:** Power and SSC connection using existing case power plug.
  - Requires opening the case to attach SSC ACPI control to motherboard
  - Uses existing case power plug
- 3) **Option 3:** Power and SSC connection using internal power connector and SSC connection.
  - Requires opening case to attach SSC
  - Requires removal of existing case power plug to connect to PSU

*Note: Similar to the installation of any aftermarket electronic device (i.e. audio power amplifier), battery power (+12V) cables, grounding cables, and fuses are NOT supplied as part of the CNX-P1280 kit. These installation cable kits can be purchased from a variety of on-line and retail locations such as auto-parts stores, Wal-Mart, and electronics outlets. The CNX-P1280 does provide “pigtail” connectors for connecting to the CNX-P1280 (see Identifying the Connecting Points above).*

### **3.0 Option 1: “Power-only” to CarPC through existing case power plug**

This is the simplest connection configuration, and also the least functional. It merely provides regulated +12V to the CarPC and does not take advantage of the on-board SSC of the CNX-P1280. However, for the beginner (or faint of heart), it may be a good starting point.

To install the CNX-P1280 in this configuration you will run 3 wires into the unit (+12v battery, Ground, and Ignition), and one power cable consisting of two wires (+12VDC, Ground) out of the unit to the C134. This installation requires the optional CNX-P1280-C134A wiring kit. Optionally, you can connect your LCD display screen (i.e. Lilliput or Xenarc) and one or more auxiliary devices such as your head-unit, audio amplifier, and electric antenna. Please note that these auxiliary devices **DO NOT** get their supply power from the CNX-P1280. They only get a “remote turn-on” signal from the CNX-P1280. This signal, called DLYON (delayed on) provides an UN-REGULATED +12VDC control signal to these units. The capacity of this line is 500mA maximum and is current limited with an internal, self-resetting fuse.

Below is a detailed connection diagram for the C134 case and Morex PSU.

# CNX-P1280 Connection Detail

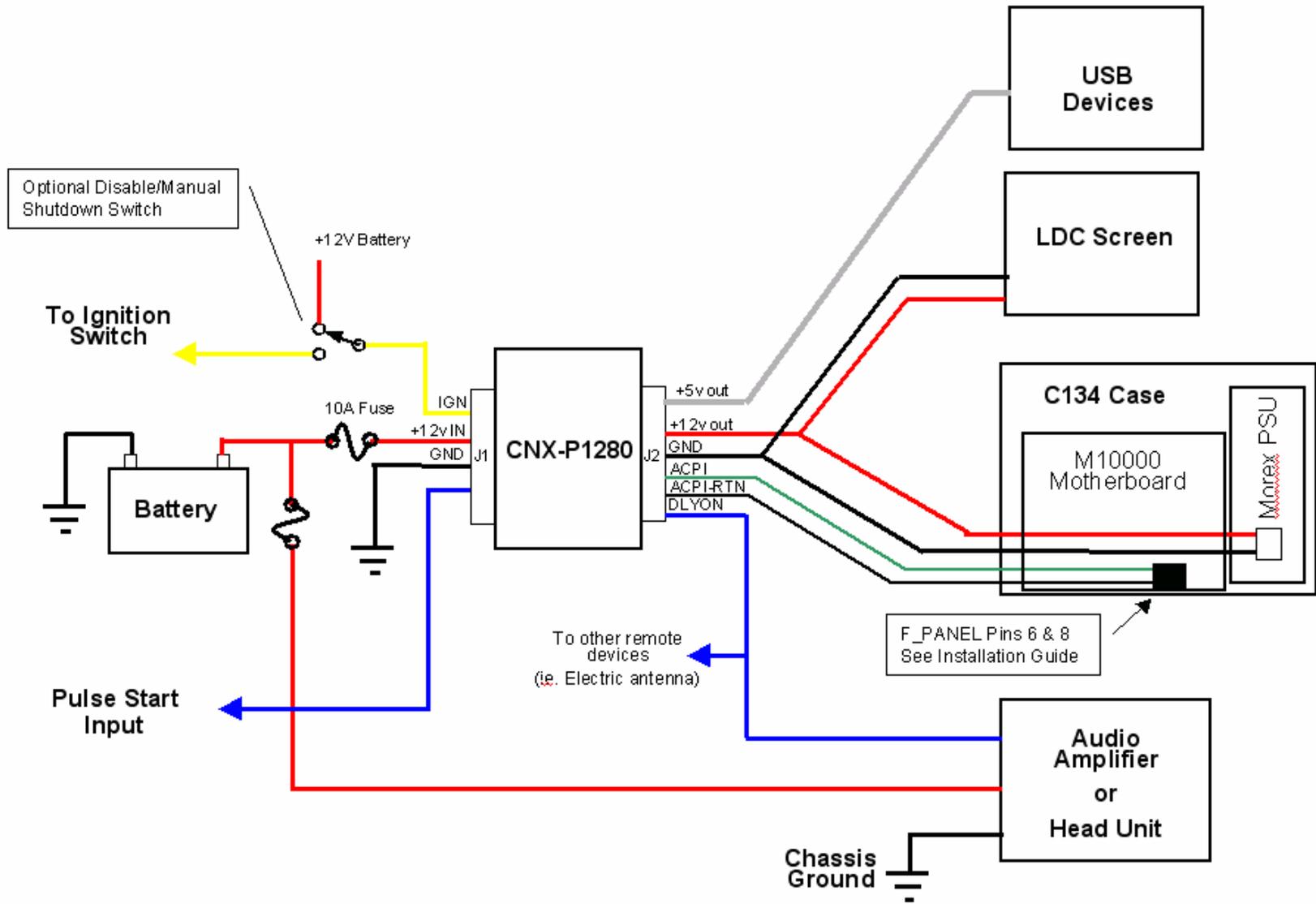


Figure 5 Typical Connection Diagram

### ***Caution!***

**Make sure you install a 10A fuse between your battery and the input to the CNX-P1280. This provides protection to your car's electrical system should there become a short in either the wire from the battery to the CNX-P1280, or within the CNX-P1280 itself. This fuse should be placed as close as possible to the battery (within 6-12 inches) so that the long run of wire from the battery to the interior of your car is protected from short circuits. It is highly recommended to provide a separate fuse (separate from other devices such as audio amp) for the CNX-P1280.**

## **3.1 Making the Connections (Option 1):**

### **Step 1. Run the Power Cable (+12V Battery Cable)**

In this step you will connect your CNX-P1280 to your battery. Make sure the CNX-P1280 connectors are UNPLUGGED from the CNX-P1280 while you are initially connecting the power, ground, and ignition cables. Until you have completed the rest of the connections, LEAVE THE 10A FUSE OUT OF THE FUSE HOLDER so that the wire is not “live” during initial installation. You will be instructed to insert the fuse later.

Once you have removed the input and output connectors from the CNX-P1280, run the power cable from the battery to the RED (pin 4) wire on the *input* connector, J1 (the input connector has 4 pins, the output connector has 6 pins). Make sure that you have a good connection to the battery, the fuse holder, and to the input connector of the CNX-P1280.

*Note: for long-lasting, reliable, safe wire-to-wire connections, it is highly recommended that you solder this type of connection instead of using crimp-type devices. Crimp devices tend to work well for a while, but work loose over a period of time and can cause problems in the future. Take the time to do the job right!*

### **Step 2. Run the Ground Wire**

After running your primary power cable, attach a wire to the car's metal chassis somewhere close to the final location of the CNX-P1280 and CarPC. Connect the other end of this wire to the BLACK (pin 1) wire on the *input* connector (J1) of the CNX-P1280. Keep this wire as short as possible and make sure it is WELL GROUNDED to a METAL part of the car's chassis. Also note that some metal portions of the car are NOT connected to the chassis and will not make a reliable grounding location. Double-check to see that your selected grounding location is indeed GROUND. If you have an ohmmeter (you can get one for less than \$20 at your local electronics shop) use this to check the resistance from your ground to the negative terminal of your car battery (you may need to borrow a piece of long wire to do this test). The resistance reading should be a short circuit (zero ohms). If you are reading higher than zero ohms, find a different grounding location.

### Step 3. Run the Ignition Wire

After the ground connection is installed, you will need to find the “ignition” wire. This wire is typically yellow and provides +12v when your ignition switch is on. Connect to this wire either by splicing into it and soldering the 3 wire-ends together, or by using a “T-tap” splice connector.

You may have to search a bit for the ignition wire, but it can typically be found connected to your radio or head-unit. It is very important that you find the correct wire since the CNX-P1280 will not function if this wire is not connected or working properly. It would be a good idea to check, with your DMM, that +12V is indeed present when you turn your ignition switch on, and that it goes away when you turn it off.

Once you have located and spliced into the ignition wire, you will run this connection to the YELLOW (pin 2) wire on the *input* connector (J1) of the CNX-P1280. One option (shown in Figure 5 above) is to put a SPST switch in series with the ignition wire before it is connected to the CNX-P1280. This gives you the ability to turn off the CarPC (or prevent it from turning on) regardless of what position your ignition switch is in.

### Step 4. Connect the output C134 Power Cable

The optional case power cable kit includes a power cable (Figure 3) with the appropriate plug to insert into the existing rear-panel-mounted case power plug. This means it is not necessary to open the case to connect power. Simply solder this power cable to the (+) RED and (-)BLACK wires on the 6-Pin *output* power connector (J2) of the CNX-P1280.



Figure 6 C134 Power Cable

***Note that the one wire of the C134 power cable is marked with a long white bar that runs the entire length of the cable. THIS INDICATES THE POSITIVE (+12v) WIRE. This wire connects to the RED +12V output of the CNX-P1280. Make sure you have connected the correct polarity or***

*you may damage your CarPC system (+ to RED, - to BLACK)! Also, make sure to insulate these connections with electrical tape to prevent short circuiting the outputs.*

### **Step 5. Connect the LCD Screen (optional)**

If you are powering your LCD screen (Lilliput or Xenarc) with the CNX-P1280, connect the optional LCD Power Cable Kit (Figure 4) to this same output from the CNX-P1280. Below is a picture of the correct way to connect these wires. Again, it is highly recommended that you SOLDER these connections and cover them with electrical tape to ensure a reliable, safe, long-term connection. *Take the time to do it right!*

*Note that the one wire of the LCD Screen power cable is marked with a long white bar that runs the entire length of the cable. THIS INDICATES THE POSITIVE (+12v) WIRE. This wire connects to the RED +12V output of the CNX-P1280. Make sure you have connected the correct polarity or you may damage your LCD Screen (+ to RED, - to BLACK)! Also, make sure to insulate these connections with electrical tape to prevent short circuiting the outputs*



**Figure 7 LCD Screen Power Cable**

Currently there is no way for the CNX-P1280 to automatically turn on your LCD screen since the LCD screens do not have a remote-on connection. However, one member of the MP3Car.com forum (Coyote) has posted a technique for auto-turn-on on his website (<http://www.media-car.fr.st/>)

### **Step 6. Connect auxiliary device(s) (optional).**

You may choose to use the CNX-P1280 to turn on power to your auxiliary devices such as audio amplifier, head-unit, or electric antenna. In this way, these devices are powered only when the CNX-P1280 is ON and providing power to your CarPC.

To use this feature, connect the DLYON (delay on) output from the CNX-P1280 to the “remote-on” input of the auxiliary device. Most car audio amplifiers have this input. You can connect several auxiliary devices in parallel to this same DLYON output, as long as you don’t exceed it’s 500mA of current limit. The output is fused with a self-resetting fuse.

*Note: the DLYON signal is NOT meant to provide POWER to your audio amplifier, head unit, or other auxiliary device. You must supply power through a separate wire from your battery to the auxiliary device. The DLYON signal is merely a control signal that tells the auxiliary device when to turn on.*

### **3.2 Applying power to the system (Option 1):**

Once you have installed the +12V battery cable, installed the fuse holder, connected your ground wire, connected your ignition wire, connected the case power cable, optionally connected your LCD screen, and optionally connected your remote devices, you are ready to apply power to the system

*Note: Before proceeding, make sure your ignition switch is turned OFF.*

#### **Step 1. Test your +12V battery cable.**

At this point we will verify that your +12v battery cable is functioning properly and has no short circuits. For this test, leave the power connectors UN-PLUGGED from your CNX-P1280, your case, and your LCD screen.

As a first step, LEAVE THE CNX-P1280 CONNECTORS DISCONNECTED UNTIL YOU CHECK THE BATTERY CABLE IN THE NEXT STEP.

Once you have DOUBLE-CHECKED all of your connections, and the RE-CHECKED all of your connections, and then, CHECKED all of your connections again, you may PUT THE 10A FUSE IN THE FUSE HOLDER. If it does not blow, there are no shorts in your wiring and you are ready to proceed to the next step. If it does blow, re-check your wiring for pinched wires or cuts in your insulation. This problem MUST be fixed before proceeding.

#### **Step 2. Apply power to the CNX-P1280**

After you have installed the fuse and verified that there are no shorts, connect the INPUT connector to the CNX-P1280 while watching its Status LED (see LED locations above). Remember, this is the +12V battery wire and is always “hot” regardless of the position of the ignition switch.

The first time power is applied to the CNX-P1280, the Status LED blinks. The number of blinks represent the software version and revision in the SSC. The blink code now includes Software Version (ie 2 blinks) followed by a “dot” (very short blink), followed by the Software Revisoin number (ie 1 blink), in this case representing software version 2.1. This allows you to distinguish which software your PSU is using by observing the LEDs.

After the blinking stops, the Status LED remains off. This is an indication that the microprocessor is working properly and the system is ready to provide power. At this point the system is in “Idle” state (see the State diagrams under the SSC section) and waiting for the ignition switch to be turned on.

If you do not see the LED blink, disconnect this connector (J1), re-check to see if that the connections are correct, check your fuse, and re-insert the connector. If it still does not blink, chances are your CNX-P1280 is not working properly, or there is no +12V power coming from the battery.

Once you have inserted the input power connector and watched the Status LED blink, you may turn on the ignition switch. If all is working properly, you should see the Status LED flash rapidly for a few seconds as it enters the startup sequence. After approximately 3 seconds power should be turned on and available to your CarPC and LCD screen. Three seconds later, a remote-turn-on signal is sent to your auxiliary devices (ie power amp). If you have access to their power indicator light, now would be a good time to see if it is ON.

Once you have applied power to the CNX-P1280, and you feel comfortable that it is wired and working properly, you can measure the voltage at its output connector (with that VOM you bought) to verify that it is indeed producing +12V before you attach the power cable to your CarPC. Be careful not to short out the output!

Before proceeding, *turn off your ignition switch* and verify that the CNX-P1280 turns off properly after the Shutdown Delay and the Boot Time have expired. These times are jumper selectable and are initially set to 6 seconds (Shutdown Delay) and 30 seconds (Boot Time). This means that CNX-P1280 will continue to provide power for 34 seconds (minimum) after you turn off the ignition. If you have configured the Shutdown delay for a longer period, or if you get impatient, you can simply unplug the input connector to turn the unit off more quickly (don't do this while your CarPC is connected since power will be immediately removed).

### **Step 3. Applying Power to your CarPC and Screen**

Once you have verified that the CNX-P1280 is producing +12V (+/-5%) at its output, it is time to plug in your CarPC and screen. Insert the connector J2 into the CNX-P1280 and the case power plug into the case rear panel power connector. Optionally, insert the LCD screen power connector into the LCD screen power connector. Note that the case power plug is slightly larger than the screen (Lilliput) power plug.

Now, turn on the ignition switch. Since you are not using the SSC, you must manually push the Start button on the front panel of the case to turn it on. Push the Start button now. You should hear/see your CarPC starting. Also, push the ON button on your LCD screen. Your CarPC should begin booting and soon you should see the welcome screen on your LCD.

*If this is NOT what you see..... Houston, we have a problem! If your PC is booting, but doesn't look right, try to turn it off by pressing the Start button again. If this doesn't send it into shutdown, turn off your ignition switch. This will remove power after the Shutdown Delay and the Boot Time (see SSC section for definitions of these). This will abruptly shut*

*down your PC and may cause HDD corruption. Do this only if things don't look right and as a last resort.*

If you have connected auxiliary devices, they should be ON at this time also (after a 3 second delay). At this point the full system should be ON and operating normally.

#### **Step 4. Turning off your system.**

Since you are not using the SSC, you must manually turn off your CarPC BEFORE you turn off your ignition to prevent corruption of your hard disk drive (HDD).

If your CarPC has booted properly and is currently running, press the Start switch on the front panel of your CarPC to initiate shutdown (you may also initiate shutdown through the normal Windows menus). Once the CarPC has fully shut itself down, you can then turn off your ignition switch. The CNX-P1280 will go through its normal shutdown process and eventually turn itself off (after the jumper-selectable Shutdown Delay time plus Boot Time).

If you have configured the CNX-P1280 jumpers to have a “boot time” that exceeds the time it takes for your CarPC to shut down, you COULD press the CarPC Start button AND turn off your ignition switch at the SAME TIME. This allows you to exit your car while the CarPC is still going through its shutdown process, knowing that the CNX-P1280 will turn off power shortly after it is finished. Be careful to select a “boot time” that exceeds the time it takes for your CarPC to shut down. This time varies depending on which shutdown mode (hibernate, sleep, or full shutdown) you have configured your CarPC to have.

Caution: If you turn off power to your CarPC before it has gone through its normal shutdown (whether it's full shutdown, sleep, or hibernation), you could damage and/or corrupt your HDD. If you are not using the SSC, make sure to shut down your CarPC before you turn off your ignition switch, or make sure you select a “boot time” that exceeds your CarPC shutdown time.

## 4.0 Option 2: Power and SSC connection to case using existing case power plug

This connection option takes full advantage of the SSC, but requires you to open the case to make the SSC connection to the motherboard. This option also uses the existing +12v input power connector on the case and requires the optional Case Power Cable to make the attachment.

Many of the steps outlined in the previous installation option (Option 1) above are the same for this case. Where they are the same, please refer to the installation details given in the previous option.

To install the CNX-P1280 in this configuration you will run 3 wires into the unit (+12v battery, Ground, and Ignition), one case power cable consisting of two wires (+12VDC, Ground) out of the unit to the case, and two wires (ACPI and it's return ground wire) to the ACPI/PWRON jumper on your motherboard . This installation requires the optional CNX-P1280-C134B wiring kit available on our website.

Optionally, you can connect your LCD display screen (i.e. Lilliput or Xenarc) and one or more auxiliary devices such as your head-unit, audio amplifier, and electric antenna. Please note that these auxiliary devices **DO NOT** get their supply power from the CNX-P1280. They only get a “remote turn-on” signal from the CNX-P1280. This signal, called DLYON (delayed on) provides an **UN-REGULATED +12VDC** control signal to these units. The capacity of this line is 500mA maximum and is current limited with an internal, self-resetting fuse.

Below is a detailed connection diagram for the CarPC case, Morex PSU, and ACPI.

# CNX-P1280 Connection Detail

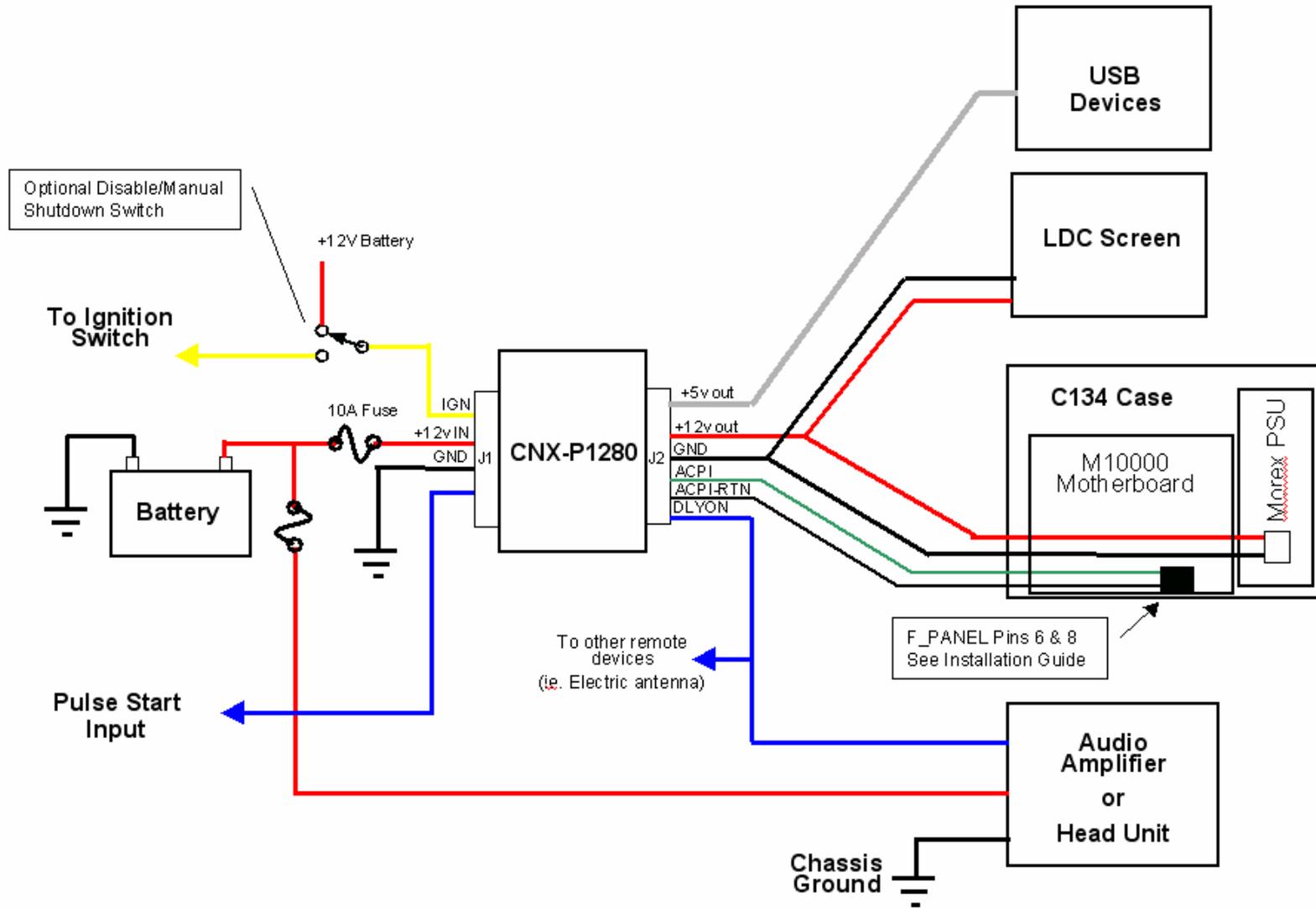


Figure 8 Typical Connection Diagram

***Caution!***

**Make sure you install a 10A fuse between your battery and the input to the CNX-P1280. This provides protection to your car's electrical system should there become a short in either the wire from the battery to the CNX-P1280, or within the CNX-P1280 itself. This fuse should be placed as close as possible to the battery (within 6-12 inches) so that the long run of wire from the battery to the interior of your car is protected from short circuits. It is highly recommended to provide a separate fuse for the CNX-P1280.**

**4.1 Making the Connections (Options 2):**

**Step 1. Run the Power Cable (+12V Battery Cable)**

This step is the same as Option 1.

**Step 2. Run the Ground Wire**

This step is the same as Option 1.

**Step 3. Run the Ignition Wire**

This step is the same as Option 1.

**Step 4. Connect the output C134 Power Cable**

This step is the same as Option 1.

**Step 5. Connect the LCD Screen (optional)**

This step is the same as Option 1.

**Step 6. Connect auxiliary devices (s) (optional).**

This step is the same as Option 1.

**Step 7. Connect the ACPI/PWRON to the motherboard**

This step requires that you open the CarPC case to gain access to the motherboard. The example used here is the Travla C134 case with the VIA Epia M10000, but all motherboards that comply with the ACPI specification would be connected in a similar manner.

To open the C134, unscrew the two thumbscrews that secure the outer shell to the inner chassis (see picture below) and gently remove the outer shell. Be careful not to pinch the wires that run on the side of the unit.

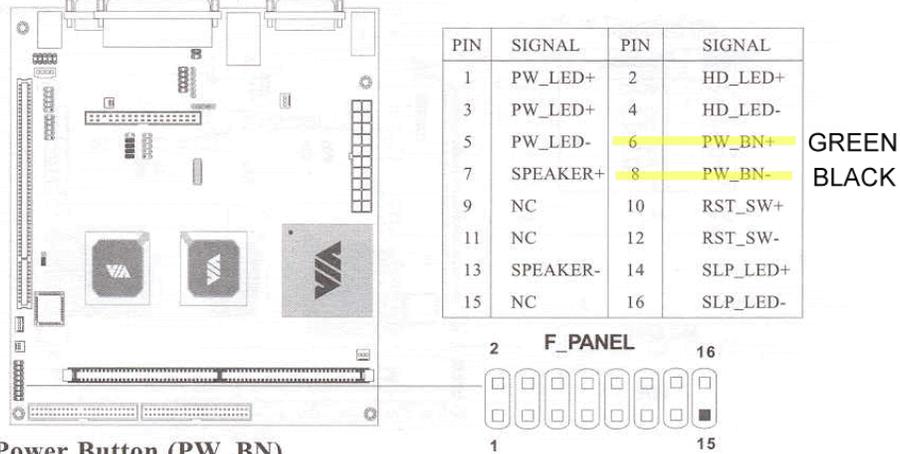


**Figure 9 Opening the C134 Case**

Once you have removed the outer shell, locate the jumper connector block labeled F\_PANEL. (See the diagram below from the M10000 User's Manual below to help locate this jumper). Remove the existing jumper cable that comes from the front panel Power Button (labeled PW\_BN in the M10000 User's Guide) and attach the CNX-P1280-P134-ACPI cable in its place. This cable attaches to pins 6 & 8 of the F\_PANEL jumper block. **NOTE THAT THE GREEN WIRE SHOULD ATTACH TO PIN 6 AND THE BLACK WIRE SHOULD ATTACH TO PIN 8.** If this connector is reversed, the ACPI signal will not properly control the motherboard boot up and shutdown operation.

**Case Connectors: F\_PANEL**

The connector block F\_PANEL allow you to connect to the Power Switch, Reset Switch, Power LED, HDD LED and SLED on the case.



**Power Button (PW\_BN)**

Connect to a 2-pin switch button. Pressing this button will turn the system power on or off.

**Reset Switch (RST\_SW)**

The Reset Switch is used to reboot the system rather than turning the power ON/OFF. Avoid rebooting while the HDD is working. You can connect the Reset Switch from the system case to this pin.

**Power LED (PW\_LED)**

The LED is lit when the system is power on. If the system is in S1 (POS - Power On Suspend) or S3 (STR- Suspend To RAM) state, the LED will blink.

**HDD LED (HD\_LED)**

HDD LED shows the activity of a hard disk drive. Avoid turning the power off while HDD LED is lit. Connect the HDD LED from the system case to this pin.

**Sleep LED (SLP\_LED)**

The SLED is lit when the system is in the S1 (POS - Power On Suspend) state.

**Speaker (SPEAKER)**

The speaker from the system case is connected to this pin.

**Figure 10 ACPI Motherboard Jumpers (F\_PANEL)**

Once you have attached the connector to Pins 6 & 8, feed the two wires through one of the vent holes on the left-hand side of the rear panel so that they protrude outside the case. Now connect these wires to the ACPI and ACPI-Return wires from J2 on the CNX-P1280 (see Figure 8 above). If you find it necessary to extend the length of this connection, use 20 or 22Gage wire so that the signal will not be deteriorated.

After making the ACPI connection you may replace the outer cover on the inner chassis, and re-attach the thumbscrews.

## **4.2 Applying power to the system (Option 2):**

Once you have installed the +12V battery cable, installed the fuse holder, connected your ground wire, connected your ignition wire, connected the case power cable, optionally connected your LCD screen, and optionally connected your remote devices, you are ready to apply power to the system

*Note: Before proceeding, make sure your ignition switch is turned OFF.*

Some of the steps in this installation case are the same as the Option 1 above. Where they are listed as being the same, please refer to the previous section for detailed instructions.

### **Step 1. Test your +12V battery cable.**

Same as Option 1.

### **Step 2. Apply power to the CNX-P1280**

Same as Option 1.

### **Step 3. Applying Power to your CarPC and Screen**

In this step we will apply power to your CarPC. Make sure it is connected to the appropriate devices (screen, mouse, keyboard, etc) so that you can verify that it is properly booting and operating.

Once you have verified that the CNX-P1280 is producing +12V (+/-5%) at its output, it is time to plug in your CarPC and screen. Insert the output power connector, J2, in to the CNX-P1280. Insert the case power plug into the case rear panel power connector. Optionally, insert the LCD screen power connector into the LCD screen power connector. Note that the case power plug is slightly larger than the screen (Lilliput) power plug. If they don't fit, don't force them. You may have them reversed.

Now, turn on the ignition switch. You should see the following sequence:

- 1) The Status LED on the CNX-P1280 will flash rapidly for approximately 3 seconds.
- 2) The fan on the CNX-P1280 will come on.
- 3) The CarPC will begin to boot
- 4) You will see power applied to your LCD screen. **PUSH THE LCD SCREEN POWER BUTTON NOW TO TURN IT ON.**
- 5) Approximately 3 seconds after your CarPC begins to boot, your auxiliary devices (audio amplifier) will come on.

At this point the full system should be ON and operating normally. If your CarPC does NOT begin to boot, re-check the polarity of the ACPI connection to your motherboard.

### **Step 4. Turning off your system.**

After the CarPC has fully booted and is operating properly, turn off your ignition switch.

You should see the following sequence:

- 1) The Status LED on the CNX-P1280 will begin to blink for approximately 6 seconds (6 seconds is the factory default. If you have jumper-selected a different Shutdown Delay Time, the Status LED will blink for a longer period of time before beginning to shut down your CarPC. Please see the SSC section for further detail).
- 2) After the Shutdown Delay has expired, the SSC sends an ACPI shutdown pulse to the CarPC. It will now begin to shut down and go either into hibernation, sleep, or complete shutdown, depending upon how you have configured it.
- 3) At this same time, DLYON is removed and your auxiliary devices will be powered down (Note: The DLYON action is jumper selectable to EITHER turn off your audio amp as soon as you turn off Ignition, OR it will leave your audio amp ON until after the Shutdown Delay has timed out. This is selectable with JP4).
- 4) As your CarPC is shutting down the Lockout LED will come on as the Status LED blinks. This will continue for 30 seconds (30 seconds is the factory default Boot Time. If you have jumper-selected a different Boot Time, this sequence will continue for 90 seconds. Please see the SSC section for further detail).
- 5) After the Boot Time has expired (the CarPC should have fully shut down by this time), the CNX-P1280 will turn off power to the CarPC and go into idle mode, monitoring the ignition switch for the next turn on.

At this point all power to your CarPC, LCD screen, and auxiliary devices is OFF.

## **5.0 Option 3: Power and SSC connection to case using internal power and SSC connections.**

This connection option is identical to Option 2 above, except for the +12V power connection to the case. In this connection option you will remove the existing rear-panel +12v power connector on the CarPC case and connect directly to the Morex PSU 2-pin power connector. This provides a more reliable +12v power connection for the automotive environment since the barrel connector provided with the case is designed for a non-mobile office environment. Removing the barrel connector also provides a convenient hole for running the +12v power cable and ACPI cables to the inside of the case.

To install the CNX-P1280 in this configuration you will run 3 wires into the unit (+12v battery, Ground, and Ignition), one power cable consisting of two wires (+12VDC, Ground) out of the unit to the Morex PSU inside the case, and two wires (ACPI and its return ground wire) to the ACPI/PWRON jumper on your motherboard. This installation requires the optional CNX-P1280-C134B wiring kit available on our website.

Optionally, you can connect your LCD display screen (ie Lilliput or Xenarc) and one or more auxiliary devices such as your head-unit, audio amplifier, and electric antenna. Please note that these auxiliary devices DO NOT get their supply power from the CNX-P1280. They only get a “remote turn-on” control signal from the CNX-P1280. This signal, called DLYON (delayed on) provides an UN-REGULATED +12VDC control signal to these units. The capacity of this line is 500mA maximum and is current limited with an internal, self-resetting fuse.

Below is a detailed connection diagram for the C134 case, Morex PSU, and ACPI.

# CNX-P1280 Connection Detail

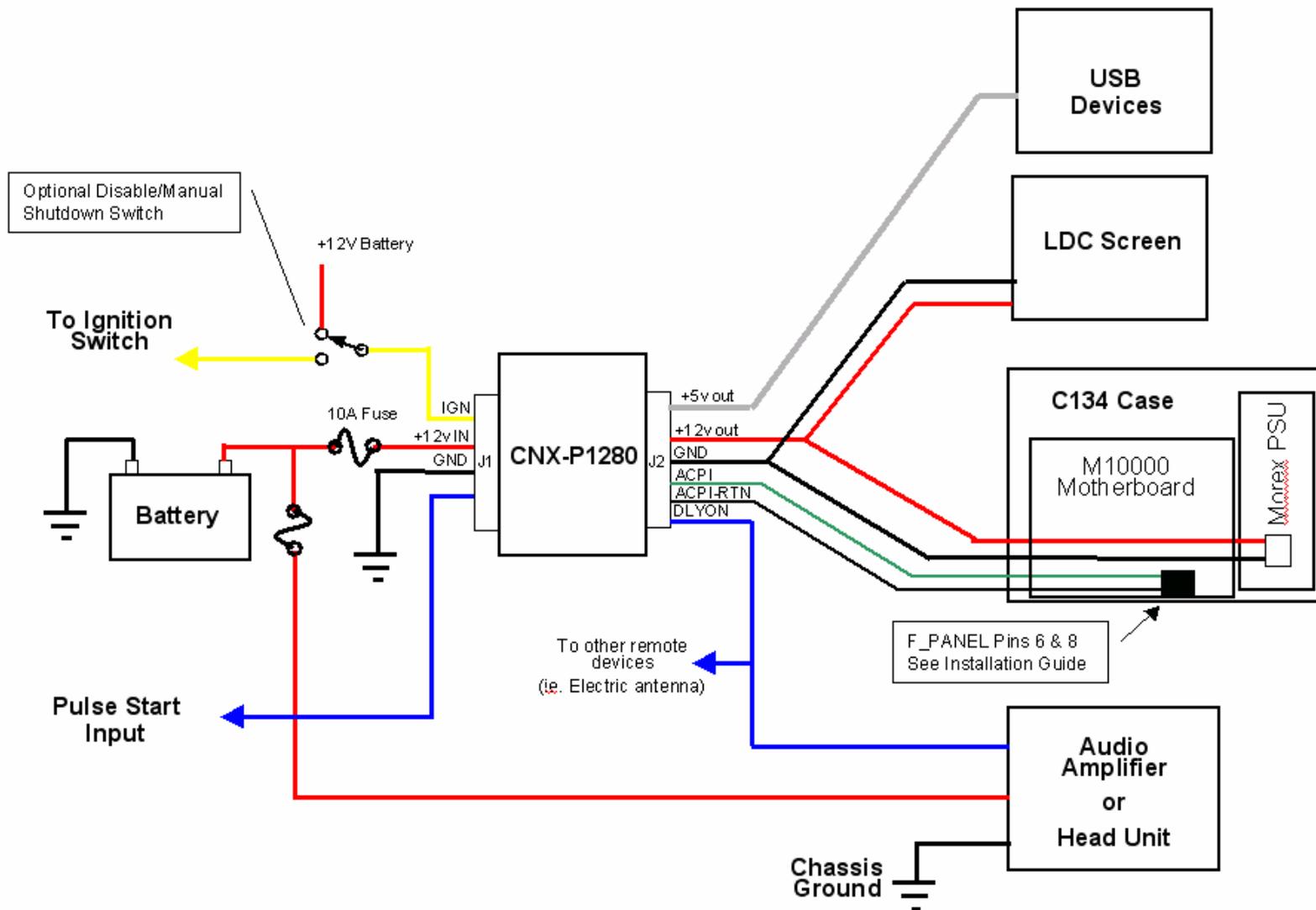


Figure 11 Typical Connection Diagram

***Caution!***

**Make sure you install a 10A fuse between your battery and the input to the CNX-P1280. This provides protection to your car's electrical system should there become a short in either the wire from the battery to the CNX-P1280, or within the CNX-P1280 itself. This fuse should be placed as close as possible to the battery (within 6-12 inches) so that the long run of wire from the battery to the interior of your car is protected from short circuits. It is highly recommended to provide a separate fuse for the CNX-P1280.**

**5.1 Making the Connections (Option 3):**

**Steps 1 through 3 are identical to Option 2 above.**

**Step 4. Connect the output Case Power Cable**

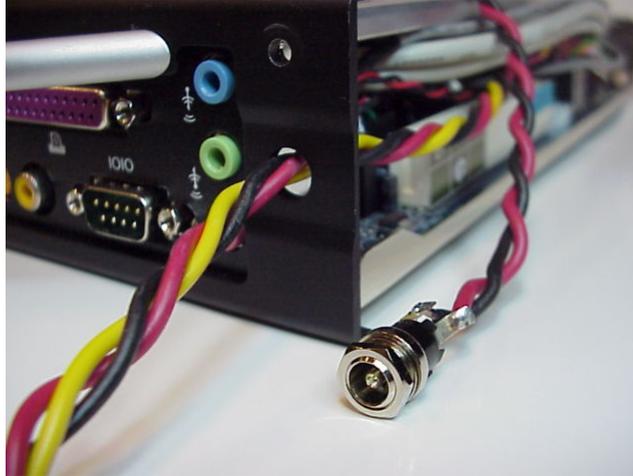
The optional case power cable kit includes a Morex PSU power cable (Figure 12) with the appropriate plug to insert into the Morex PSU power connector. This requires opening the case as described in Option 2 above.



**Figure 12 Morex PSU Power Cable**

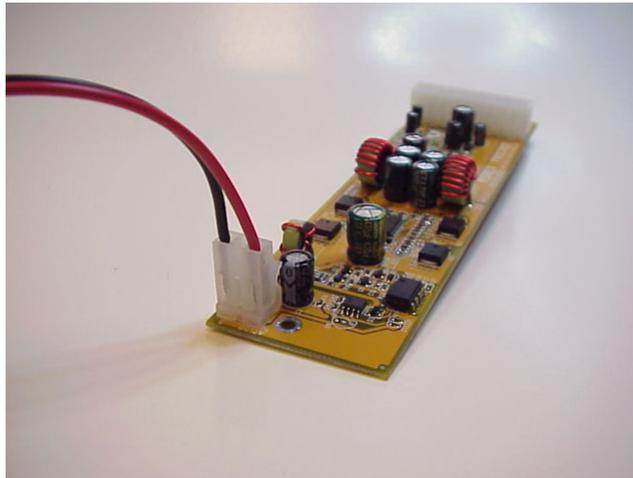
The following example shows the Travla C134 case. Installation in other cases would be similar.

Once you have opened the C134 case, remove the existing power cable by 1) unscrewing the hex nut that holds the connector in the chassis (Figure 13), and 2) unplugging the cable from the 2-pin Morex power connector. Set this cable aside for future use.



**Figure 13 Removing the existing C134 Power Connector**

Now, insert the CNX-P1280 C134 power cable into the 2-pin Morex PSU power connector (Figure 14) and feed the two wires through the hole where the original C134 rear-panel power plug was installed. Connect these two wires to the RED (+12V) and BLACK (GND) wires on J2 of the CNX-P1280.



**Figure 14 Attaching Morex PSU Power Cable**

***Make sure you have connected the correct polarity or you may damage your CarPC system (+ to RED, - to BLACK)! Also, make sure to insulate these connections with electrical tape to prevent short circuiting the outputs.***

Once you have made this connection, and installed the ACPI cable as described in Case 2, you can replace the outer shell of the chassis and re-insert the thumbscrews.

**Steps 5 & 6 are identical to Option 2 above.**

## ***5.2 Applying power to the system (Option 3):***

This entire section is identical to Option 2 above with the exception of the discussion of case power connection as described above.

## 6.0 Using the Pulse Start Feature

The CNX-P1280 (Versions 1.5 and above) includes a new 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.

### 6.1 Pulse Start Connections

The Pulse Start input can either be an externally applied voltage (ie +5v or +12V) pulse, or a momentary relay contact closure. The externally applied voltage pulse is connected to Pin 1 of J1 using the Blue wire. The momentary relay contact closure is connected to Pins 1&2 of JP1 (see Section 2.2 for location). You can use either or both of these connections to start/stop the PSU.

### 6.2 Pulse Start Operation

#### 6.2.1 What is a pulse?

##### ***Voltage Pulse on Pin 1 of J1***

When connecting to Pin 1 of J2, 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).

##### ***Contact Closure Pulse on Pins 1&2 of JP1***

When connecting to Pins 1&2 of JP1, the “pulse” must be a low resistance metallic contact closure (ie relay) that transitions from OPEN to CLOSED, ***and then back to OPEN***. The SSC will wait (hang) if the contact closure remains CLOSED after the initial transition from OPEN to CLOSED.

The current passing through this relay is very small (milliamps) so a low power relay can be used.

##### ***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.

#### 6.2.2 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 Pulse Start input, 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.

### **6.2.3 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.

### **6.2.4 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.

### **6.2.5 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 CarPC when your file transfer process is completed.

### **6.2.6 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 CarPC with your wireless device, but then get into your car and drive.

## 7.0 CNX-P1280 Startup/Shutdown Controller

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The CNX-P1280 includes an intelligent, microprocessor-based startup/shutdown controller. The CNX-P1280 Startup/Shutdown Controller (SSC) provides safe, reliable control over your CarPC's bootup and shutdown (full shutdown or hibernation) processes. The chief concerns of the SSC are protecting your hard drive from corruption, protecting your car battery from being discharged, and protecting the PSU from overheating.

### 7.1 Hibernate/Standby Operation

The CNX-P1280 supports both Hibernate and Standby operation of your CarPC. This option is jumper selectable with Pins 5 & 6 on JP1.

When supporting Hibernation the P1280 completely shuts down all power to the CarPC after the Shutdown Lockout State. However, if Standby mode is selected, the P1280 continues to provide +12V after the Shutdown Lockout State is completed, but turns off its fans to conserve power. This has several very important ramifications.

1) In Standby your CarPC continues to receive +12V power from the P1280 so that it can retain the processor state in RAM. If for some reason the CarPC did not properly shut down when it received the ACPI shutdown pulse from the P1280, it will continue to draw current from the P1280. **THIS WILL CAUSE THE P1280 TO OVERHEAT AND POTENTIALLY SELF-DISTRUCT.** You **MUST** make sure your CarPC properly enters the Standby State before you exit your car. If you don't, you may return to your car surrounded by the local fire department.

2) Any USB devices connected to your CarPC via the USB connector will continue to draw current in the Standby state. **THIS COULD POTENTIALLY DRAIN YOUR BATTERY IF THE CURRENT DEMAND OF YOUR USB DEVICES IS VERY HIGH.** Exercise caution when using USB devices in the Standby mode.

***Standby should only be used after you fully understand the above points. If you do not understand the above information, DO NOT USE THE STANDBY MODE.***

### 7.2 SSC Operation States

#### 7.2.1 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 10.5 volts, the SSC will not allow the CarPC to boot. If the battery is above 10.5 volts, the SSC will allow the CarPC to boot normally.

#### 7.2.2 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 CarPC.

### **7.2.3 Bootup Lockout State**

After the CarPC is powered, the ACPI (PWRON) strobe is sent to the motherboard. 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 jumper-selectable 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. The Lockout Time is jumper-selectable at either 30 seconds or 90 seconds. This allows users who have configured their CarPC for hibernation to enjoy a faster shutdown sequence (30 seconds) than those who have their CarPC configured for full shutdown (90 seconds).

### **7.2.4 Run State**

After the Lockout period ends, the SSC enters the Run state. During this time your CarPC is running normally and the SSC continues to monitor your car battery, the PSU fan, and the output current. If the battery dips below approximately 10.5volts for more than 10 seconds, or if the fan fails, 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.

### **7.2.5 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 CarPC running for a jumper selectable time after the ignition is turned off. The selectable time periods are 6 seconds (default) and 15 minutes. 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 (see Section 6 Remote Start Pulse).

When this Shutdown Delay time has elapsed, the SSC enters the Shutdown Sequence state (see below).

The SSC timing is designed to accommodate the use of the ACC wire instead of the IGN wire to control the SSC. Note that during engine cranking, the ACC wire drops from +12V to zero volts. The SSC has a minimum 6 second delay to accommodate this temporary interruption in input voltage if the CarPC was already running when you start (or re-start) your engine. This delay will also give you time to briefly turn off the ignition switch to stop your engine (ie at a gas station) and immediately turn the ignition switch back on to keep the CarPC running indefinitely.

### **7.2.6 Shutdown Sequence State**

At the beginning of this state the SSC issues an ACPI (PWRON) strobe to the motherboard. 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 CarPC motherboard while it is shutting down. The Shutdown Lockout time is the same length as the Bootup Lockout time and is jumper-selectable for either 30 seconds or 90 seconds. After the Shutdown Sequence State, the SSC re-enters the Idle State and waits for the ignition switch to be turned on.

### **7.2.7 Forced Shutdown State**

If the SSC detects either 1) a low battery (<10.5volts for >10seconds), 2) a fan fault, or 3) 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 CarPC.

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### **7.3 Fault Indicator LEDS**

The CNX-P1280 has 2 LEDs that give an indication of the status and states of the SSC. The pattern and blink-rates of these LED have different meanings depending upon what state the SSC is in. Below is a link to the LED codes.

**CNX-P1280 Operation States**

<b>Normal Operation</b>					
	<b>PSU Output</b>	<b>LED1</b>	<b>LED2</b>	<b>State</b>	<b>Description</b>
	OFF	OFF	OFF	Idle State	PSU is idle and waiting for ignition/accessory switch to be turned on. It is monitoring battery voltage during this time.
	ON	Fast Blink	OFF	Run Delay State	PSU is on and waiting for output voltages to stabilize before turning on CarPC
	ON	ON	ON	Bootup Lockout	PSU is on and has sent ACPI pulse to motherboard. No changes can occur until after boot period. This time period is jumper selectable at either 30 sec (boot from hibernation) or 60 sec (full boot).
	ON	ON	OFF	Run State	PSU is on and motherboard is running. No faults have been detected.
	ON	BLINK10%*	OFF	Shutdown Delay	PSU is waiting before going into shutdown cycle. This delay period is jumper selectable for 6 sec (default) or 15min. After this delay PSU goes into shutdown Lockout state.
	ON	BLINK50%*	OFF	Shutdown Lockout	PSU is in the process of shutting down and has sent ACPI pulse to motherboard. No changes can occur until after shutdown lockout period (same as Boot Lockout period, 30sec or 60sec, jumper selectable). After Shutdown Lockout state, PSU shuts down power and goes into Idle State, waiting for IGN/ACC to be turned on.

<b>Fault Conditions</b>					
	<b><i>PSU Power</i></b>	<b><i>LED1</i></b>	<b><i>LED2</i></b>		
	OFF	OFF	ON	Low Battery/IGN OFF	Low battery voltage detected (<10.6V). PSU will not start unless battery voltage is greater than 10.6V.
	OFF	BLINK10%*	ON	Low Battery/IGN ON	Low battery voltage detected (<10.6V) and IGN/ACC switch is on, or remote pulse has attempted to start PSU. PSU will not start unless battery voltage is greater than 10.6V.
	ON	BLINK10%*	ON	Major Fault Pending	Low battery, Fan Fault, or over current condition is detected. PSU will wait 10 seconds for condition to clear. If condition persists for more than 10 seconds, PSU goes into Forced Shutdown state.
	ON	BLINK50%*	BLINK50%	Forced Shutdown	A major fault has occurred (persistent low battery, fan fault, over current fault) and the PSU is in Forced Shutdown state. There is no Shutdown Delay before shutdown begins. Shutdown time is set by Shutdown Lockout jumper setting (30sec or 90sec). Once Forced Shutdown begins, clearing the fault condition will not abort the Forced Shutdown cycle. After Forced Shutdown, PSU waits for IGN/ACC switch to be turned off, then on, before it will attempt to restart.
	OFF	BLINK10%*	ON	Abnormal Shutdown	A major fault has occurred (persistent low battery, fan fault, over temperature fault) and the PSU was forced to shutdown. IGN/ACC switch must be turned off, then back on, before PSU will attempt to restart. You should check the status of the battery, fan, and ventilation if this fault occurs.

\* BLINK10% means that the LED is on 10% of the time and off 90% of the time (ie, short blink).

\* BLINK50% means that the LED is on 50% of the time and off 50% of the time.

**Table 2 Status/Fault Indicator LED**

