



PS20 Hardware Manual
Rev A

Release Date: August 19, 2009



PS20 Theory of Operation

If you turn the computer off through the Windows shutdown box on the main screen and the switch power is still on, the PS20 will just reboot the system in a few seconds. Conversely, if the system senses the switch power is down, after a short delay, it will shut down Windows orderly as if you had shut it down yourself. The PS20 system will go to sleep waiting for switch power to come back up for a few seconds and then it will boot again. It will finish booting no matter what the power state and then check switch power again to see if it needs to stay up or it needs to shutdown Windows.

The vehicle's key initiates power connection to the computer. This wakes the computer up and boots the operating system. There is no on/off switch or button on the computer. To reboot the computer, simply turn the key switch off, wait for the computer to go through orderly shutdown. Red light will be on. After the red light is out, turning the key switch on will automatically boot the computer.

Green LED = Vehicle switch power ON

Red LED = Vehicle switch power OFF and computer in shutdown mode

NO LED = Computer disconnected from battery

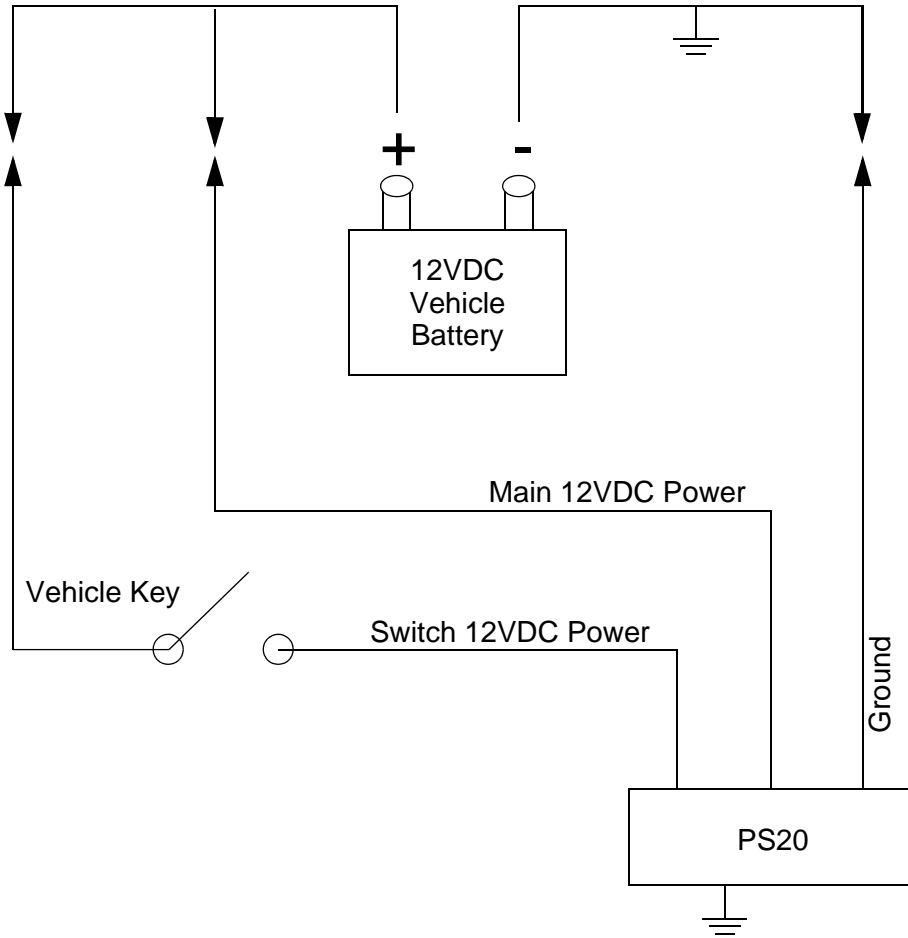
This computer uses a 3-wire power input.

The main 12VDC wire is connected directly to the positive terminal of the vehicle's battery to allow for the computer to perform orderly shutdown after the key has been turned off. This connection is enabled and disabled internally and will not drain the vehicle's battery once the motherboard has shutdown.

The switch 12VDC wire input connection goes to switched power, usually the ignition switch, and when closed causes the computer to wake up and boot. When this switch is open, the computer will switch over to the main battery connection and will shutdown.

The third wire is system ground. This should be connected to the main battery or an extremely high quality ground point. Do not use chassis grounds on older vehicles.

Power Connection Diagram





Glossary of Abbreviations

| | |
|------|------------------------------|
| CAN | Controller Area Network |
| BIOS | Basic Input Output System |
| BV | Breakdown Voltage |
| CF | Compact Flash |
| CPU | Central Processing Unit |
| GPIO | General Purpose Input Output |
| HD | Hard Drive |
| I/O | Input/Output |
| LED | Light Emitting Diode |
| OS | Operating System |
| PWR | Power |
| SATA | Serial-ATA |
| USB | Universal Serial Bus |
| VDC | Volts Direct Current |

Start Up Sequence

1. Connect peripheral cables required for your application.
2. Connect unit to DC power source.
3. Apply DC power to turn unit ON.
4. Green PWR LED should come ON.
5. During normal operation, if the switch power as indicated by the green PWR LED is interrupted, the red STAND-BY LED will come ON to indicate that switch power is off but the computer is still active and in shutdown mode.



Environmental Specifications

| | |
|------------------------------------|-------------------------|
| Storage Temperature | -20 ~ 85°C (-4 ~ 185°F) |
| Operational Temperature | 0 ~ 60°C (32 ~ 140°F) |
| Storage Shock (half sine wave) | 1000 G / 1 ms |
| Operational Shock (half sine wave) | 300 G / 2ms, 160G / 1ms |

Input Protection Clamp

This unit has an input protection clamp to protect from voltage transients induced by lightning and other transient voltage events.

Features

- Bi-directional
- 5000W Peak Pulse Power capability on 10/1000 μ S waveform
- Repetition rate (duty cycle): 0.05%
- Response time: typically less than 1.0pS from 0 Volts to BV

| Power Input Clamp Maximum Ratings and Characteristics @ 25°C Ambient Temperature | | | |
|--|--------------------|----------|-------|
| Rating | Symbol | Value | Unit |
| Peak Pulse Power Dissipation on 10/1000 μ S waveform | P _{PPM} | Min 5000 | Watts |
| Peak Pulse Current of on 10/1000 μ S waveform | I _{PPM} | 129 | Amps |
| Steady State Power Dissipation at T _L =75°C, Lead Lengths .375", (9.5mm) | P _{M(AV)} | 8 | Watts |
| Peak Forward Surge Current, 8.3mS Single Half Sine-Wave Superimposed on Rated Load, (JEDEC Method) | I _{FSM} | 400 | Amps |

| Power Input Clamp Electrical Specification @ T _{AMB} 25°C | | | | | | |
|--|--|-------|----------------------------------|---|--|--|
| Reverse Stand off Voltage V _R (Volts) | Breakdown Voltage V _{BR} (Volts) @ I _T | | Test Current I _T (mA) | Maximum Clamping Voltage V _C @ I _{PP} (Volts) | Maximum Peak Pulse Current I _{PP} (A) | Maximum Reverse Leakage I _R @ V _R (µA) |
| | MIN | MAX | | | | |
| 24.0 | 26.70 | 29.50 | 5 | 38.9 | 129.0 | 10 |

The transient voltage suppression specifications above are subject to change depending on the required input clamp voltage for the application. System can operate on voltages of up to 48VDC under special circumstances. Consult the factory. The input is 60V transient capable past the input clamp. Different clamp voltages are available for specific applications.

Cell Modem SIM Card



The modem is contained on the inside of the PPS20 lid. On the end of the modem, there is a grey rubber plug. Remove plug and insert the SIM card into the SIM card socket. Replace the plug to retain the SIM card.

Input Voltage Considerations

Nominal Operational Voltages 9.5 - 16.5VDC

Even though the PS20 is fused internally, you must provide an additional 5-10A fused input.



Operation

- Applying power will turn ON the computer and boot your OS automatically.
- Power control system is always checking for the presence of switch power and if the computer is running.
- If switch power is present, the power control will check to see if the OS is booted. If not, it will attempt to boot OS. If it is unsuccessful after 25 attempts, the power control will put the system to sleep and you must cycle switch power in order to boot OS again.
- If the power control senses switch power is down for 8-14 seconds continuously, then it will initiate OS shutdown on main power.
- If switch power comes back anytime during shutdown sequence and before it goes to sleep, it will attempt to reboot OS without requiring you to recycle the power. Power recycling is only required if system is fully asleep, otherwise the system will be fully automatic and should not require power cycling during normal operation. This is a rare situation.
- Once system has shutdown and gone to sleep (all front panel LEDs OFF), you must cycle switch power to reboot system.
- The system will always try to boot OS if switch power is present at any time, except when system has gone fully to sleep (i.e.: all front panel LEDs are OFF).
 1. Turn ON switch power.
 2. System will boot itself and remain ON until switch power is turned OFF.

Turning OFF switch power for a short period of time will initiate OS shutdown on main power and sleep mode. The power control will disconnect from all outside power (ie: red LED is off) after it senses the OS has completely shut down. This is automatic, there are no drivers for this function.

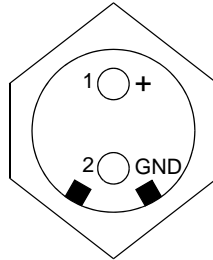
Repairs

All repairs should be done at the Aplus Mobile, Inc. factory or in extreme cases serviced by a qualified super-technician capable of aircraft system-level work.

There are no user serviceable or replaceable parts inside the system. The CPU cannot be replaced without total disassembly of the case. Please consult the factory for any upgrades.

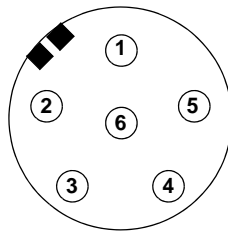
Custom Connector Pin Out

Output Power



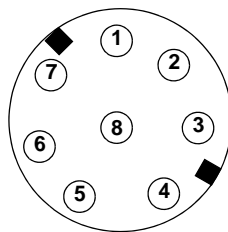
1.5A Max Current

Input Power



| | | |
|---|-----|---------------------|
| 1 | GND | Black |
| 2 | + | Red Switch+ |
| 3 | + | Red Switch+ |
| 4 | + | Red Main (Battery+) |
| 5 | + | Red Main (Battery+) |
| 6 | GND | Black |

GPIO



| | |
|---|-----|
| 1 | GND |
| 2 | GND |
| 3 | GP0 |
| 4 | GP4 |
| 5 | GP1 |
| 6 | GP5 |
| 7 | GP2 |
| 8 | GP6 |

PS20 System Watchdog Timer

See watchdog timer documentation on the supplied driver cd.

PS20 GPIO

See GPIO documentation on supplied driver cd.



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