General Wiring and Troubleshooting Guide

Applies To All Powered PMT Vehicle Docks

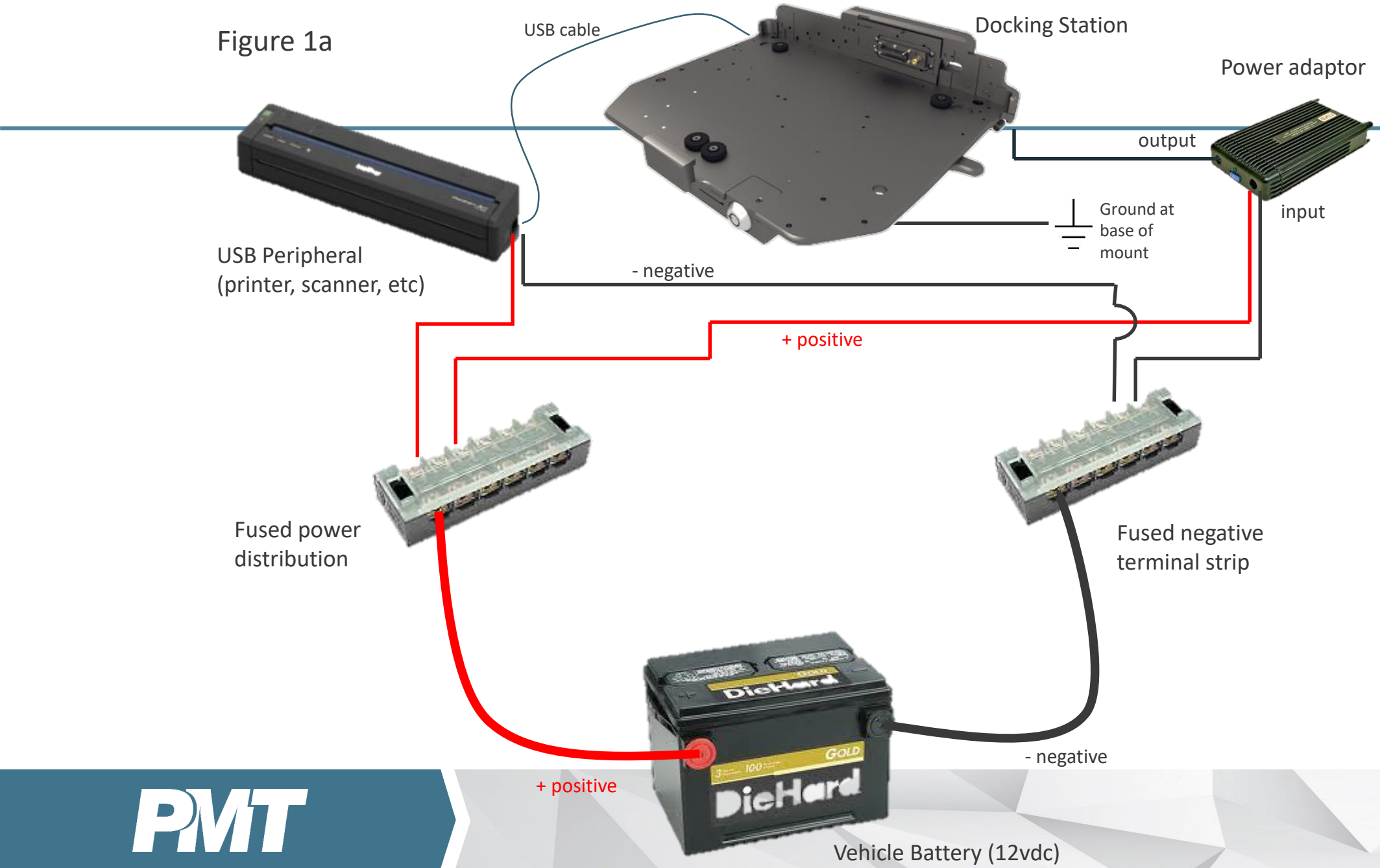
Recommended Wiring Technique

1. PMT recommends hard-wiring all power adapters into the vehicles power system. This means that if the adapter for your device or vehicle dock came with a cigarette socket plug on it's input cable, it should not be used. Instead, cut the cigarette socket adapter end off of the cable, then strip the bare wire and use crimp connectors to properly and reliably interface power and ground into the vehicles power system.

2. When adding peripherals such as video systems and USB printers, etc to a vehicle docking station, PMT recommends that all devices be connected to common sources for both power and ground connections. It is also preferential to use a ground source that is connected directly to the negative terminal on the vehicle battery. Refer to figure 1a on the following page.

Note: USB is susceptible to power and ground loops. This is due to active power coming from the computer dock via the USB cable (+5v Red and 0v black).
If the peripheral (such as a printer or video system) has it's own power supply there can be an offset in the +5v and 0v on the USB coming out of the peripheral, and this can cause problems with equipment and connectivity. To help minimize potential problems, PMT recommends wiring in a dedicated ground wire from a suitable location on the vehicle dock (vacant screw hole), to the base of the mount that it is connected to.

Figure 1a


USB cable
Docking Station
Power adaptor
output
input
Ground at
base of
mount
USB Peripheral
(printer, scanner, etc)
- negative
+ positive
Fused power
distribution
Fused negative
terminal strip
+ positive
- negative
Vehicle Battery (12vdc)

Troubleshooting

If you are unsure of potential ground and power loops within your vehicles wiring, and you are having trouble with USB devices, follow the below procedure to identify and eliminate any potential ground or power loop problems. Refer to figure 2a and 2b on the following page.

Step 1: Cut a USB extension cable (male to female) in half and strip both ends of the power and ground wires (red and black) so that you can connect a volt meter to get readings. (The green and white data lines are not needed for this procedure).

Step 2: Plug the male end of the cut extension cable into the vehicle dock (with computer docked) being careful not to let the red positive wire touch any metal surface as it will be live with 5 volts.

Step 3: Connect the female end of the cut extension cable to the peripheral.

Step 4: Connect the volt meter to the leads to be tested and power up the system. Dock-computer-peripheral

Step 5: Measure the DC voltage

1. Red to red (should be almost 0 volts)
2. Black to black (should be almost 0 volts)
3. Red to black on dock side (should be about 5 volts)
4. Red to black on peripheral side (should be almost 0 volts)

Step 6: If the voltages are not as above please check your power system for incorrect wiring and possible power and ground loops.

Figure 2a

Male to female USB extension cable

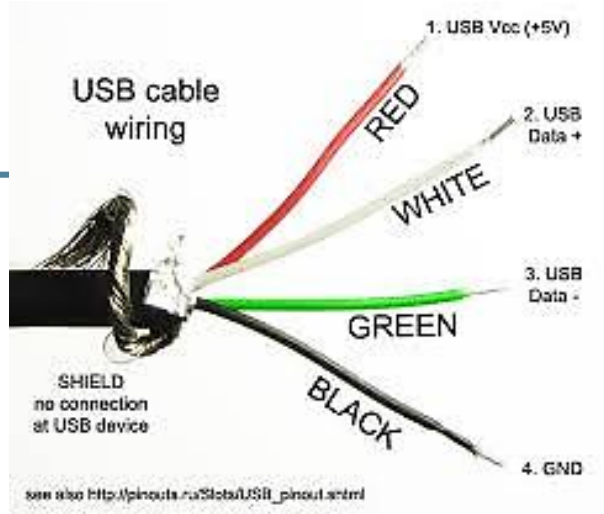


Figure 2b

Female end to peripheral

Male end to vehicle dock

Troubleshooting Continued

Drivers:
Another potential cause of USB related problems comes from improper or missing drivers installed on the host computer. Check on the computers device manager section in the control panel in Windows based computers for anything that is flagged with a yellow exclamation point. Try uninstalling then reinstalling the correct driver for your device. You may need to manually force your computer to check for updates through windows update to ensure that all necessary drivers are installed.

USB/COM Port Drivers:
If you are having issues with the serial/com port on your dock, please look into the driver for FTDI RS-232 to USB converter (FT232 USB UART) and ensure it is operating correctly. A link for the driver and installation instruction can be found here: https://www.usb-drivers.org/ft232r-usb-uart-driver.html
Also, refer to https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers

USB Port Limitations:
A common miss-conception is that all USB ports are the same and can power any device. This is wrong and can lead to a dead port if too many high current draw devices are connected to it. Currently the circuit boards in vehicle docks can only support 250mA on USB2.0 and 500mA on USB 3.0 of current draw per port which is not enough to charge many of todays high powered smart phones and tablets. There are dedicated USB “charging” ports on many computers (see figure 3a below) and these are usually labeled differently than normal ports, however vehicle docks are not meant to provide charging current. PMT does offer solutions for this in the form of optional dedicated USB charging ports that are available as accessories from us and charge at up to 1000mA.

Figure 3a

Non-charging USB port Charging USB Port