



NERV CENTR[®]



SQUAD POWER MANAGER[™]
USER GUIDE

TABLE OF CONTENTS

THE SQUAD POWER MANAGER (SPM) IS A 6 PORT DEVICE USED TO MANAGE POWER FROM A VARIETY OF SOURCES.

Squad Power Manager Overview	4
Connecting A Battery	5
Powering A Radio	6
Charging The Battery	6
Adding Devices	7
Power From Vehicles And Charging Vehicle Batteries	8
Battery To Battery Charging	10
Making An Uninterruptible Power Supply (UPS)	11
Using the Display and Keypad	12
Using Datalogging	34
Maintenance	36
Troubleshooting	40
Cautions	41
Contacting Galvion	42



SQUAD POWER MANAGER OVERVIEW

HERE IS GENERAL INFORMATION ABOUT THE SPM:

1. The SPM has 6 power ports with rubber dust caps. Ports 3 and 4 are Scavenger Ports, and Ports 1, 2, 5 and 6 are General Purpose Ports.
2. An LCD screen provides the user with diagnostic information needed to troubleshoot problems and obtain information about the devices connected to the SPM ports. The integrated 4 button keypad can be used to navigate the display.
3. All available SPM cables fit all ports. To plug a cable into the SPM, align the small red line on the side of each plug and each socket.
4. All cables are labeled at both ends. On the “equipment end” of the cable, the label provides information regarding which device the cable was designed for.

NOTE: Cables should only be used in conjunction with the gear they were designed for. Please verify the label before use and contact Galvion to purchase additional cables.

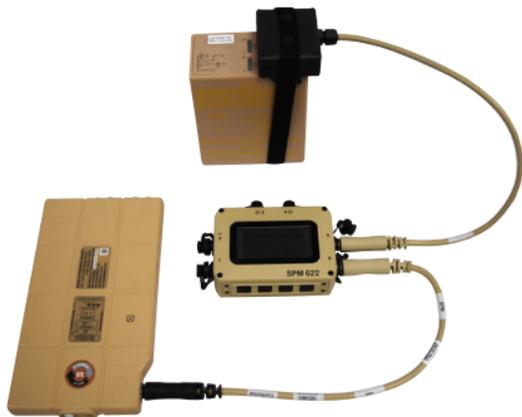
5. The SPM and connected equipment cannot be damaged from faulty connections.



CONNECTING A BATTERY

When a charged battery (SoloPack Battery, Smaller PRC-148 and 152 batteries, vehicle battery, conformable wearable battery, etc) is connected to the SPM, the power manager will turn on.

BB-2590 NOTE: The battery ships with a small sticker on the top, covering several small metal pads. These pads let the SPM “talk” with the battery, allow for faster charging and for the SPM to display more accurate information. Before use, remove the “SMBus sticker” from the BB-2590.



CAUTION: THE CONFORMAL WEARABLE BATTERY CABLE HAS ONE BLACK END AND ONE TAN END. ALWAYS PLUG THE BLACK END INTO THE BATTERY AND THE TAN END INTO THE SPM.

SQUAD POWER MANAGER OVERVIEW

POWERING A RADIO

1. Find the correct radio power cable in your SPM kit.
2. Connect the “equipment end” of the cable to the radio – depending on the radio this may mean twisting it on, plugging it in, or removing a battery box.
3. Plug the other end of the cable into the SPM.

In most cases, the radio will automatically turn on and the SPM will display the model of the radio that has been connected. However, the below situations may occur:

- The SPM may prompt you to use a different port. If so, swap the ports as instructed.
- The SPM may prompt you to connect an additional battery, as some bigger radios require more power than a small battery can provide – try adding an additional battery or an alternative energy source, such as solar or vehicle power, to the SPM.

CHARGING THE BATTERY

Follow the below steps to add an energy source (solar power, automotive, AC wall adapters, etc) to recharge a battery that has been drained.

1. Connect one end of the cable to the selected energy source.
2. Connect the other end of the cable to ports 3 or 4 on the SPM. The sun icons next to these ports indicate that the ports are optimized for scavenging energy.
3. Once step 1 and 2 have been completed, small arrows on the screen will show that power is now going into the battery.

ADDING DEVICES

Additional radios, computers, batteries and other devices can now be added to the SPM to power or charge.

NOTE: Batteries are used to power equipment and are charged when an energy source is connected. Energy sources are used to power gear and charge batteries. Gear can be powered by energy sources and batteries.

MORE USES

The next section describes additional SPM capabilities. These capabilities may help reduce the amount of gear needed and add flexibility to your missions.

POWER FROM VEHICLES AND CHARGING VEHICLE BATTERIES

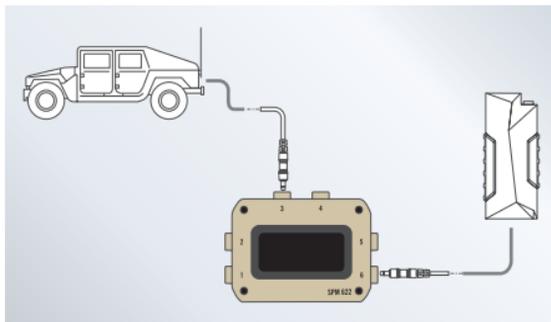
The SPM is commonly used to charge radio batteries and power equipment from a vehicle battery or power jack. However, the SPM can also be used to recharge a drained vehicle battery.

To scavenge power from the vehicle, connect it to ports 3 or 4. To power the vehicle, connect it to ports 1, 2, 5, or 6.

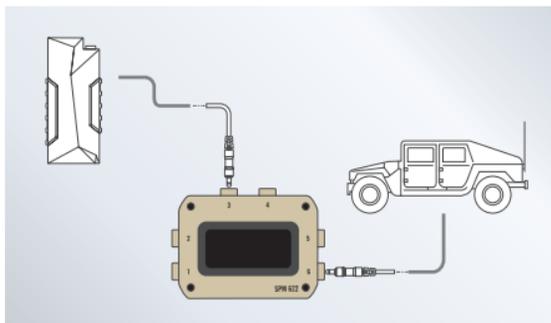
SQUAD POWER MANAGER OVERVIEW

HERE ARE TWO EXAMPLES:

The SPM will charge the SoloPack battery by drawing power from the car via the cigarette receptacle.

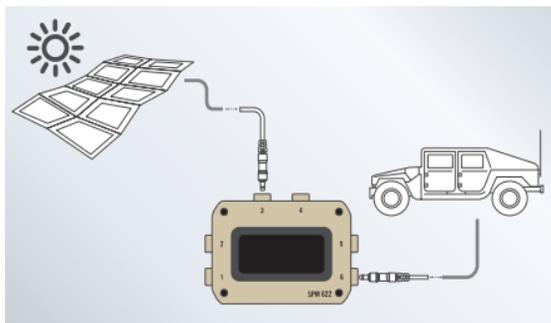
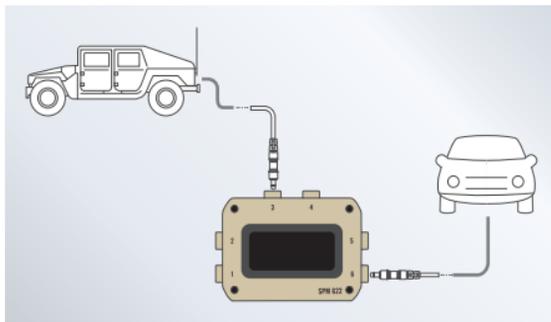


The SPM will charge the car's battery by scavenging power from the SoloPack battery - after a couple hours the car should start.



In the top example, the car's battery is being charged by the Humvee. In the example below, the Humvee's battery is being charged by solar power.

NOTE: When batteries are connected to **BOTH** Ports 3 or 4 **AND** Ports 1, 2, 5, or 6, the SPM will pull energy out of the battery or batteries connected to ports 3 or 4 and will push that energy into the battery or batteries connected to the other ports. The SPM also assumes that the cigarette plug cable and the NATO slave cable both connect to the car or truck batteries. In this case, it can use them both for pulling power from the vehicle and also for charging the vehicle batteries.

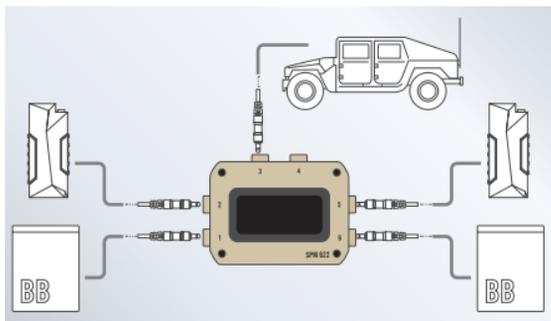
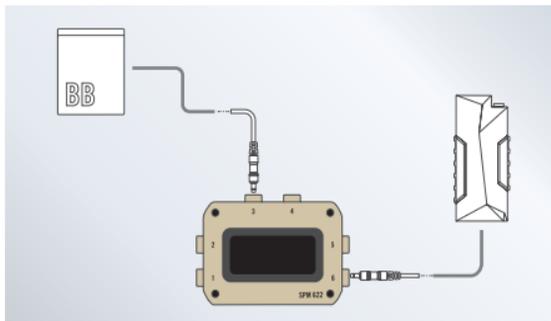


SQUAD POWER MANAGER OVERVIEW

BATTERY TO BATTERY CHARGING

The SPM can be used to easily shuttle energy between identical or different batteries simply by connecting the source battery (the one to pull energy from) into ports 3 or 4, and the destination battery (the one to charge) into one of the other ports.

A vehicle can charge more than one battery.

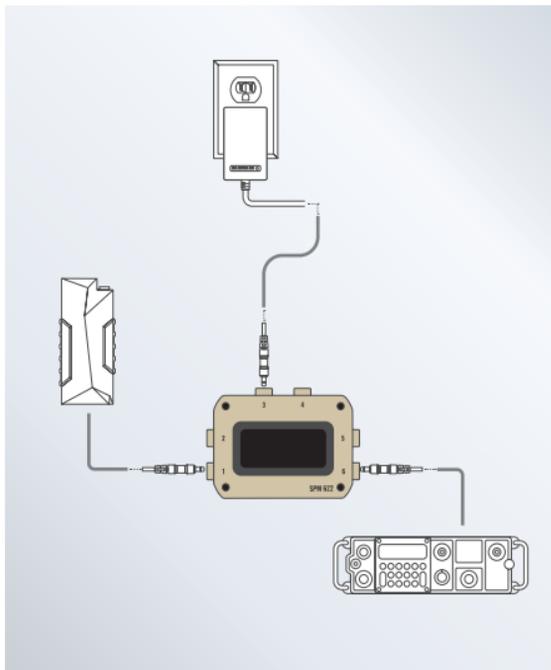


MAKING AN UNINTERRUPTIBLE POWER SUPPLY (UPS)

The SPM can act as an UPS by connecting it to a rechargeable battery, an AC wall input and a powering device. The SPM can be used to provide uninterruptible power to a SatCom radio. As long as AC power is available, the battery remains fully charged and the radio is powered by AC power. If the AC power fails, the radio is then powered by the SoloPack Battery. The SPM automatically switches the radio from being AC powered to being battery powered.

When AC power is restored, the SPM instantly switches the radio back to AC power and also recharges the battery.

The SPM can support multiple batteries in this configuration if needed.



USING THE DISPLAY AND KEYPAD



USE THE DISPLAY AND KEYPAD TO GET ADDITIONAL POWER DETAILS AND TO CONFIGURE THE SPM.

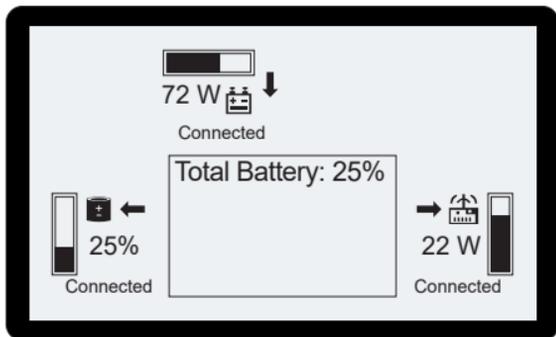
THE KEYPAD HAS FOUR BUTTONS:

- The right arrow or “**ENTER**” button selects a menu or an option.
- The left arrow or “**ESCAPE**” button exits a menu without making a selection.
- The **UP/DOWN** arrows scroll through menus or options.

THE SPM SCREEN

When a battery is connected and the SPM powers on, the following information will be displayed:

- On the initial screen, the “**VER**” number on the left side represents the version of the software installed on the SPM.

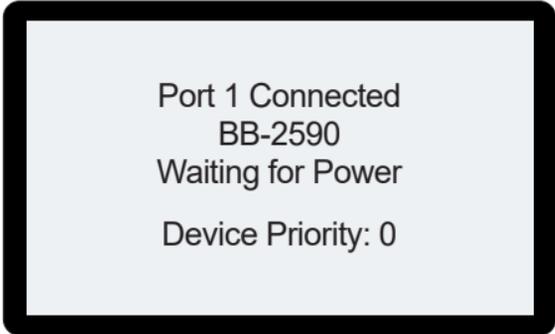


- A few seconds later, the display will switch to a different screen. Next to each port is a small bar-graph, an icon, arrow, percentage (or wattage number), and a port status depending on what is plugged into each port.
- The center of the screen displays different information depending on the system configuration and situation:
 - If smart batteries (like a Solopack, BB-2590 or a Conformal Wearable Battery) are attached to the SPM, the center of the screen shows how much “**MISSION TIME**” remains. This represents the time before all attached batteries are completely drained.

USING THE DISPLAY AND KEYPAD

- If a power source is attached and the batteries are charging, the screen will display the delay before the batteries are fully charged. It also displays the battery percentage remaining for all attached smart batteries. Therefore, if one battery is full and the other is empty, the total percentage displayed will be 50%. If the mission time cannot be calculated, it is not displayed.
- If the system determines a more optimal configuration to power more devices, it may display “**-WARNING- NO BALLAST BATTERY DETECTED (SEE HELP FOR MORE INFO)**”, “**-NOTE- MOVE PORT X CABLE TO PORT Y TO POWER MORE DEVICES**” or “**-NOTE-SWAP PORT X AND PORT Y TO POWER MORE DEVICES**”.
- The center screen may also display informational/caution advice such as “**-NOTE- NO AVAILABLE RESOURCES TO POWER PORT X**”, “**-WARNING- MANUAL INPUT ACTIVE**” or “**CAUTION: CASE IS HOT. ONLY TOUCH WITH GLOVES**”.

When an additional device is plugged into the SPM, a summary and status update of the device will be displayed and new icons will appear next to the corresponding port.

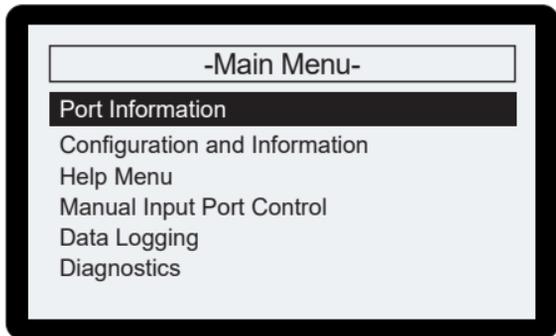


Port 1 Connected
BB-2590
Waiting for Power
Device Priority: 0

As an example, if a Dell laptop cable is plugged into Port 5, the center screen will briefly display “**PORT 5 CONNECTED - DELL LAPTOP**”. Once the main screen returns, a laptop icon will be featured next to Port 5. There are also four buttons along the bottom edge of the SPM. These buttons can be used to get additional information and to customize the SPM.

MAIN MENU

From the overview screen, press the right arrow once to enter the main menu.



- **PORT INFORMATION** - See detailed information about each port and connected devices
- **CONFIGURATION AND INFORMATION** - Monitor and change how the SPM operates.
- **HELP MENU** - Get help on how to use the SPM.
- **MANUAL INPUT PORT CONTROL** - Control how Ports 3 and 4 behave.
- **DATA LOGGING** - Control how the SPM tracks usage information.
- **DIAGNOSTICS** - Show detailed technical information.

NOTE: FOR ALL MENUS, SMALL ARROWS ON THE BOTTOM RIGHT HAND SIDE OF THE SCREEN INDICATE IF THERE ARE ADDITIONAL CHOICES OFF-SCREEN.

USING THE DISPLAY AND KEYPAD

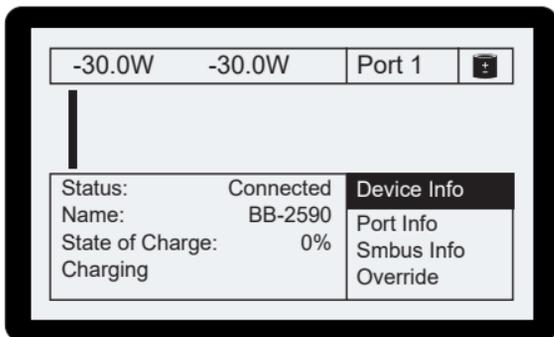
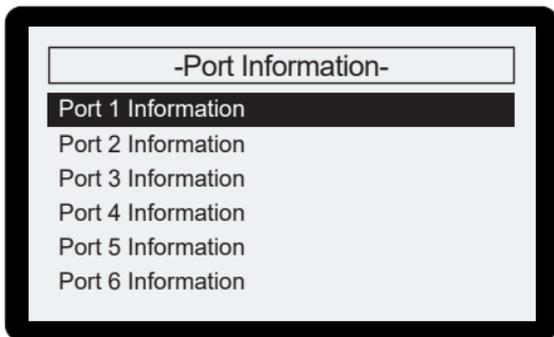
PORT INFORMATION

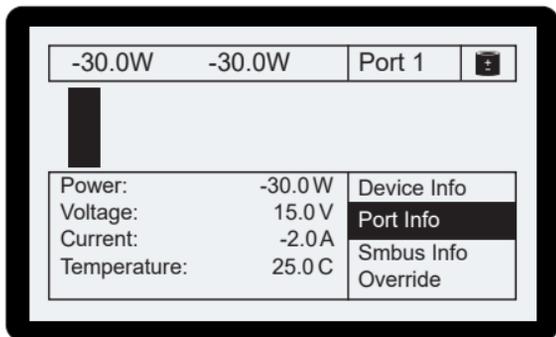
Select this menu item to get more detailed information about a particular port - often for diagnosing a problem.

You can select the port of interest using the up and down buttons and then the right arrow key to enter.

In the upper portion of the screen is a graph of power usage over time, along with the maximum value (upper left corner) and current value (center) of the graph. The graph builds from left to right, and shows increases and decreases in power.

NOTE: power flowing out of the power manager is shown as a negative value and power flowing into the power manager is shown as positive value.





The lower right portion of the screen displays a sub-menu, and the lower left portion displays different values, depending on which sub-menu item is selected.

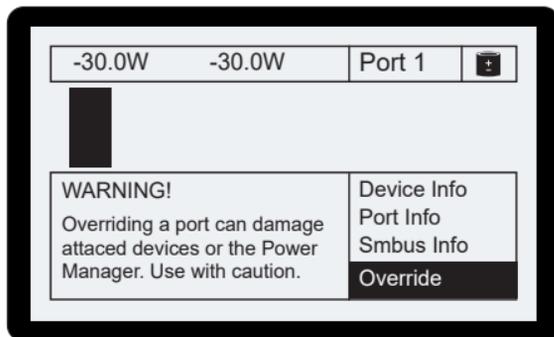
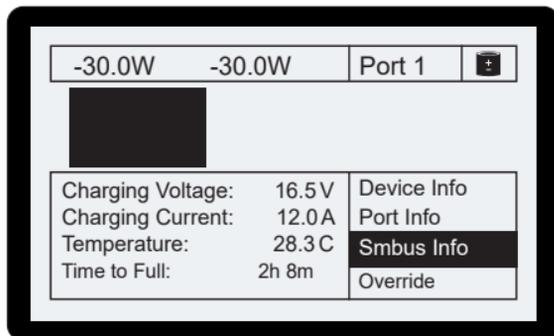
- **DEVICE INFO** - This shows what device is plugged in and whether it is connected or not. If a battery is plugged into the port, the state of charge and whether it is currently charging or discharging (or idle) is shown. If a piece of equipment or an energy source is connected, the percentage of that device's total power capability is shown. If the device has any errors or warnings, they will be displayed on the 'Status' line.
- **PORT INFO** - This shows the power, voltage, and current observed at the port, as well as the temperature of the port's circuitry inside the SPM.

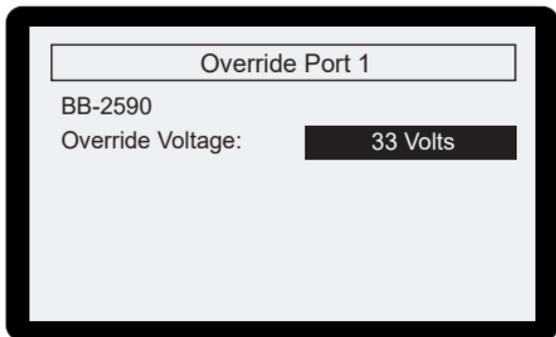
USING THE DISPLAY AND KEYPAD

- **SMBUS INFO** – If a smart battery is attached to this port, this section shows the charging voltage and current being requested by the battery, the battery's internal temperature, and the battery's estimate time before being fully charged or depleted.
- **OVERRIDE** – Use this function to override a Port from what the SPM believes its function should be.

WARNING!

YOU CAN DAMAGE EQUIPMENT OR INJURE YOURSELF USING THIS FUNCTION - READ THE "PORT OVERRIDE" SECTION OF THIS USER GUIDE AND USE THIS FEATURE WITH CAUTION.





Press the right button one more time to acknowledge the caution message.

Use the up and down buttons to increase or decrease the voltage supplied. The Port can be set to any voltage between 3 and 33 volts and can also have the Port function as if there is a battery attached. If you continue pressing up or down, you will reach settings to make the Port charge and discharge several common military batteries.

Only select these batteries when one is connected to the port.

To save, select the desired port and voltage and press the right button.

To reset the port to the default voltage, locate the 'Reset' value with the up and down buttons.

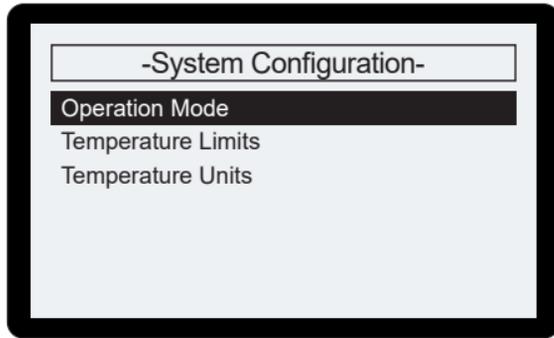
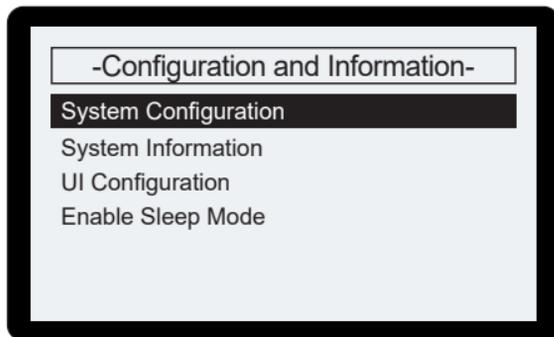
NOTE: The SPM will resume using the default value for the Port if the cable is unplugged or if power to the SPM is lost.

USING THE DISPLAY AND KEYPAD

CONFIGURATION AND INFORMATION

Select the Configuration and Information screen from the main menu.

The System Configuration menu provides the following options:



THE OPERATION MODE HAS FOUR BEHAVIORS THAT CAN BE SELECTED.

Operation Mode

Active:	Normal
Select Mode:	No Battery Transfer

This mode prevents the system from draining batteries on Ports 3 and 4 to charge other batteries. They will still be used to run other devices normally.

NORMAL: This is the default behavior mode. The SPM will operate automatically. In this mode, the SPM will scavenge energy from any battery plugged into Ports 3 or 4 into any rechargeable battery connected to Ports 1, 2, 5, or 6. When charging multiple batteries, the SPM will attempt to charge the fullest battery first, then move on to the next fullest, etc.

NO BATTERY TRANSFER: This mode will block any power from batteries that are plugged into port 3 and 4 from travelling to any other battery plugged into other ports. The plugged in batteries (in Port 3 and 4) will still be used to run other devices normally.

SEQUENTIAL CHARGE: This mode allows the user to control which batteries are charged first. The battery attached to Port 1 will charge first, the battery attached to Port 2 will charge second and so on (Port 6 being the last one to charge).

SEQUENTIAL AND NO XFER: This option enables both of the previous two options, No Battery Transfer and Sequential Charging.

USING THE DISPLAY AND KEYPAD

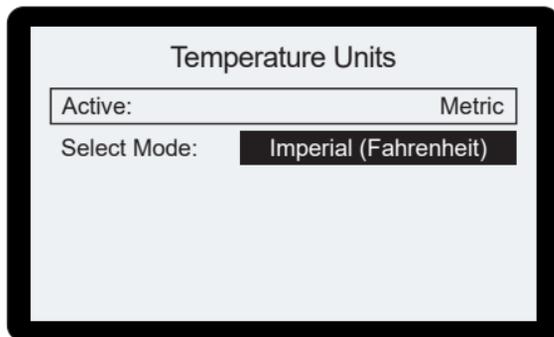
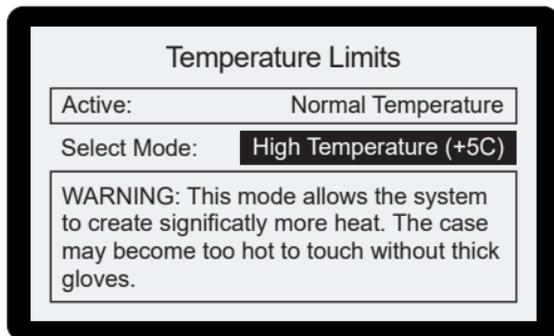
The Temperature Limits screen will display the following:

When in **NORMAL TEMPERATURE MODE**, the SPM will control how much power it moves so that the case temperature does not exceed 60 degrees Celsius. Selecting “**HIGH TEMPERATURE**” mode will allow the case temperature to reach 65 degrees Celsius so that more power can be moved in warmer environments.

WARNING!

YOU SHOULD USE GLOVES WHEN HOLDING A SPM IN HIGH TEMPERATURE MODE.

Use the Temperature units screen to select between Fahrenheit and Celsius temperature units. Changing this selection does not affect operations.



System Information

Firmware Version:	0.0.1
Run Time:	0h 11m 26s
Total Run Time:	0h 15m 42s
Power Cycles:	9
Serial Number:	0
Calibration Date:	None

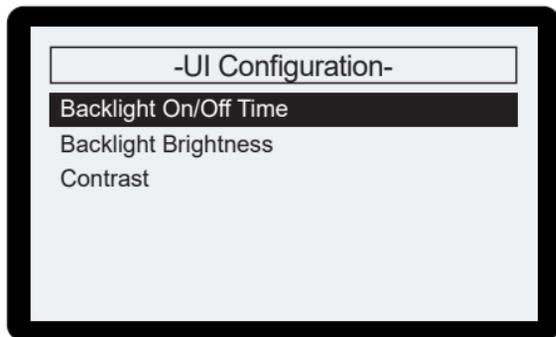
The System Information screen shows the SPM's current firmware, as well as the unit's run time (time since last power cycle), overall run-time, the number of times power has been applied to the unit, the SPM's serial number and the date last calibrated.

USING THE DISPLAY AND KEYPAD

The UI configuration screen will show the following:

Several aspects of the display can be configured to meet user preferences and mission requirements.

- **BACKLIGHT ON/OFF TIME** - By default, the display backlight is on for 5 seconds. The backlight can be customized to stay on from 1 to 60 seconds, always off, or always on, following the last button push on the SPM. Use the up and down arrows to select a value and then the right arrow to make that selection active.
- **BACKLIGHT BRIGHTNESS** - Use the up and down arrows to select a value and then the right arrow to make that selection active.
- **CONTRAST** - Use the up and down arrows to select a value and then the right arrow to make that selection active.



CAUTION: THE BRIGHTER YOU MAKE THE BACKLIGHT, THE MORE POWER THE SYSTEM WILL USE WHILE IT IS ON.

SLEEP MODE DISPLAY

Use this function to power down all devices and to enter low power mode. Reverse this mode by pressing the right and left arrow buttons at the same time.

This mode is typically used when the SPM is wired, and the user wants to **“TURN EVERYTHING OFF”** without accessing each piece of equipment individually.

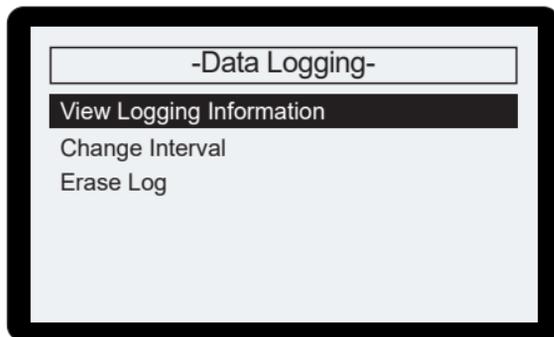
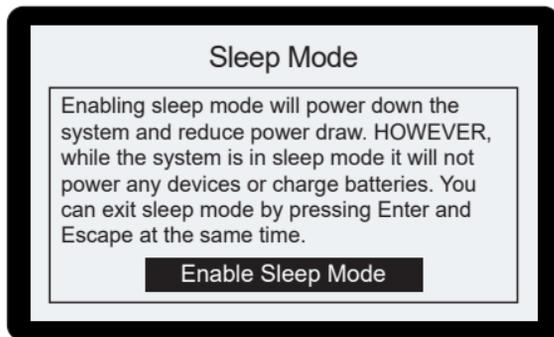
When the SPM awakes from sleep mode, it restarts as if it were power cycled.

DATA LOGGING

This menu provides information on how much log is being used. It is also possible to change the interval at which the SPM logs information.

WARNING!

SELECTING ERASE LOG WILL DELETE EVERYTHING IN THE LOG.

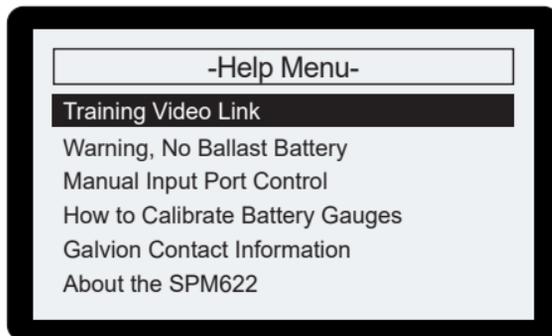


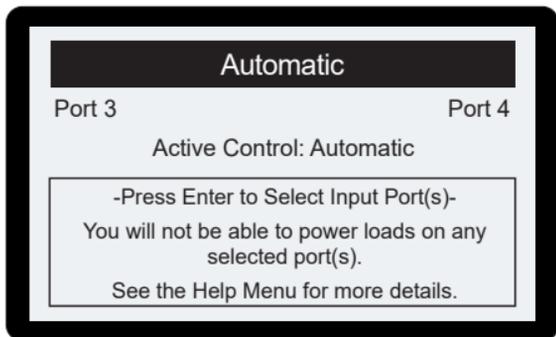
USING THE DISPLAY AND KEYPAD

HELP MENU

THE HELP MENU SCREEN OFFERS A BRIEF NARRATIVE ON THE FOLLOWING:

- Warning, No Ballast Battery - For optimal operation, a compatible battery is required to act as a ballast for the system. Without this battery, the system may be unstable. To name a few, batteries such as the BB-2590, the SoloPack and Conformal Wearable Batteries fill this role.
- Manual Input Port Control - Using manual input port control allows the user to take control of port 3 and 4. The SPM will make decisions on how to use port 3 and 4 if no manual input is provided.





THE MANUAL INPUT PORT CONTROL SCREEN WILL DISPLAY THE FOLLOWING:

- Automatic is the default mode. If it is desired for Port 3 or 4 to be input only ports, (never move power out of the SPM) use the up and down arrows to select between: Input on 3 only, input on 4 only or input on 3 and 4.
- How to Calibrate Battery Gauges – A battery gauge that needs calibrating may not function as expected. Take the following steps to calibrate a battery gauge:
 1. Fully drain the battery.
 2. Fully charge the battery.
 3. Repeat steps 1 and 2.

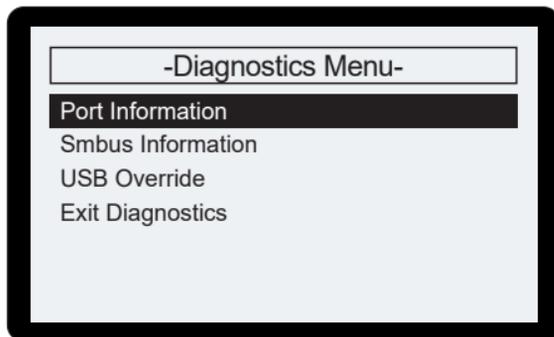
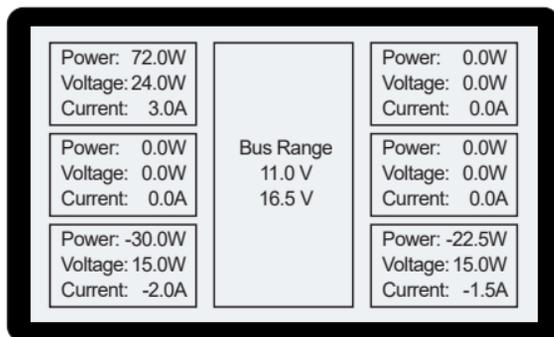
The battery gauge should function properly after the above steps have been taken. If this warning still appears after calibration, replace the battery.

USING THE DISPLAY AND KEYPAD

DIAGNOSTICS

The Diagnostics screen shows power, voltage, and current for all six ports. It also shows the active internal bus voltage of the system. Typically, this will be used when looking for a system power problem, under direction of Galvion technical support personnel.

For more information, press the right button. The Diagnostics Menu screen will appear:



Port 1 Cable Data

Min V:	11000 mV
Max V:	16500 mV
Nom V:	15000 mV
Max Load I:	5000 mA
Max Discharge I:	10000 mA
Ave Power:	0 mW
Peak Power:	0 mW
Unique Properties:	0x0 ↓

Port 1 Smbus Data

Device Name:	BB-2590
Manufacturer Name:	Bren-Tronics
Manufacture Date:	2009-7-31
Requests Reconditioning:	NO
Serial Number:	20457
Cycle Count:	37
State of Charge:	52%
Temperature:	28.3C ↓

AFTER CHOOSING THE DESIRED PORT:

- Port Information: Stored information of the cable attached to the port will be displayed on the screen.
- SMBus Information: If a SMBus battery is attached to the SPM, live SMBus information will be displayed on the screen.

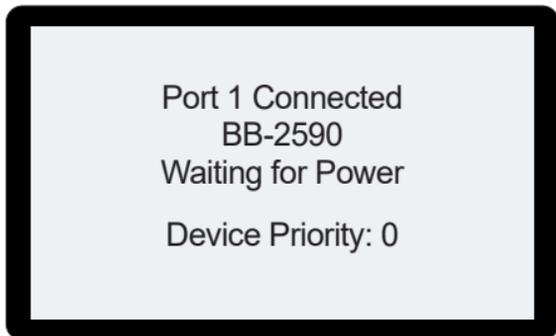
USB Override - Allows the user to manually enable, disable or rest the USB connection.

USING THE DISPLAY AND KEYPAD

PORT UPDATE SCREEN

Whenever a device is plugged in or removed, the port update screen will appear.

This screen will also appear whenever an important status change occurs on a port. Depending on the attached device, The following are some typical messages.



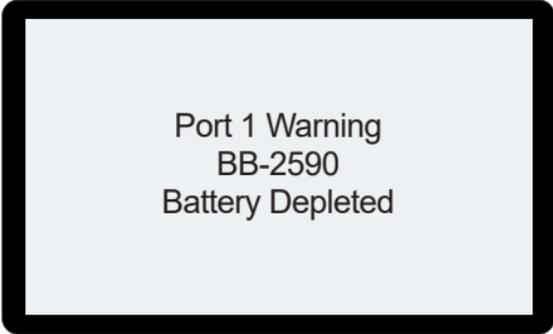
ERRORS: Over Voltage, Under Voltage, Over Current, Port Over Temp, Battery too Hot to Use, Battery is bad, Incompatible Device.

WARNINGS: Port Temp Warning, Battery Depleted, Battery too Hot to Charge, Battery too Cold to Charge, Use P3 or P4, Use P1, 2, 5 or 6, Batt Gauge Uncalibrated, Insufficient Power.

OTHER: USB Capable, USB in Port 2 Only, Uart Capable, Charge Complete, Waiting for Power, Output Override, Input Override.

INFORMATIONAL: This device is for use with a different Power Manager, Reconnect Attempt: X of Y, Reconnect Attempts Failed, See SPM Help Menu, Device Priority: X

The following are some typical messages.



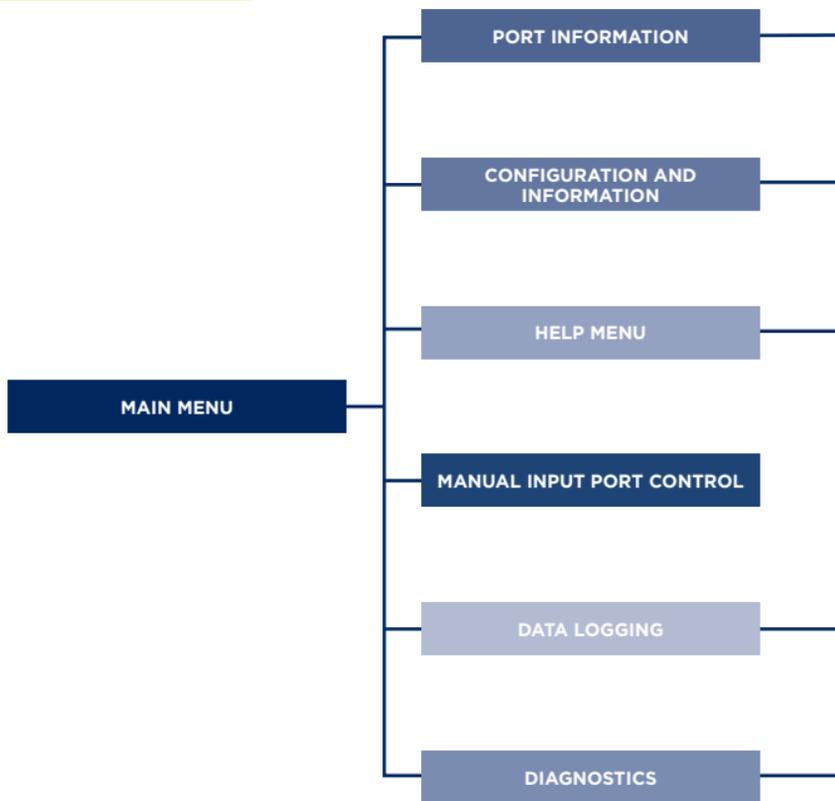
Port 1 Warning
BB-2590
Battery Depleted

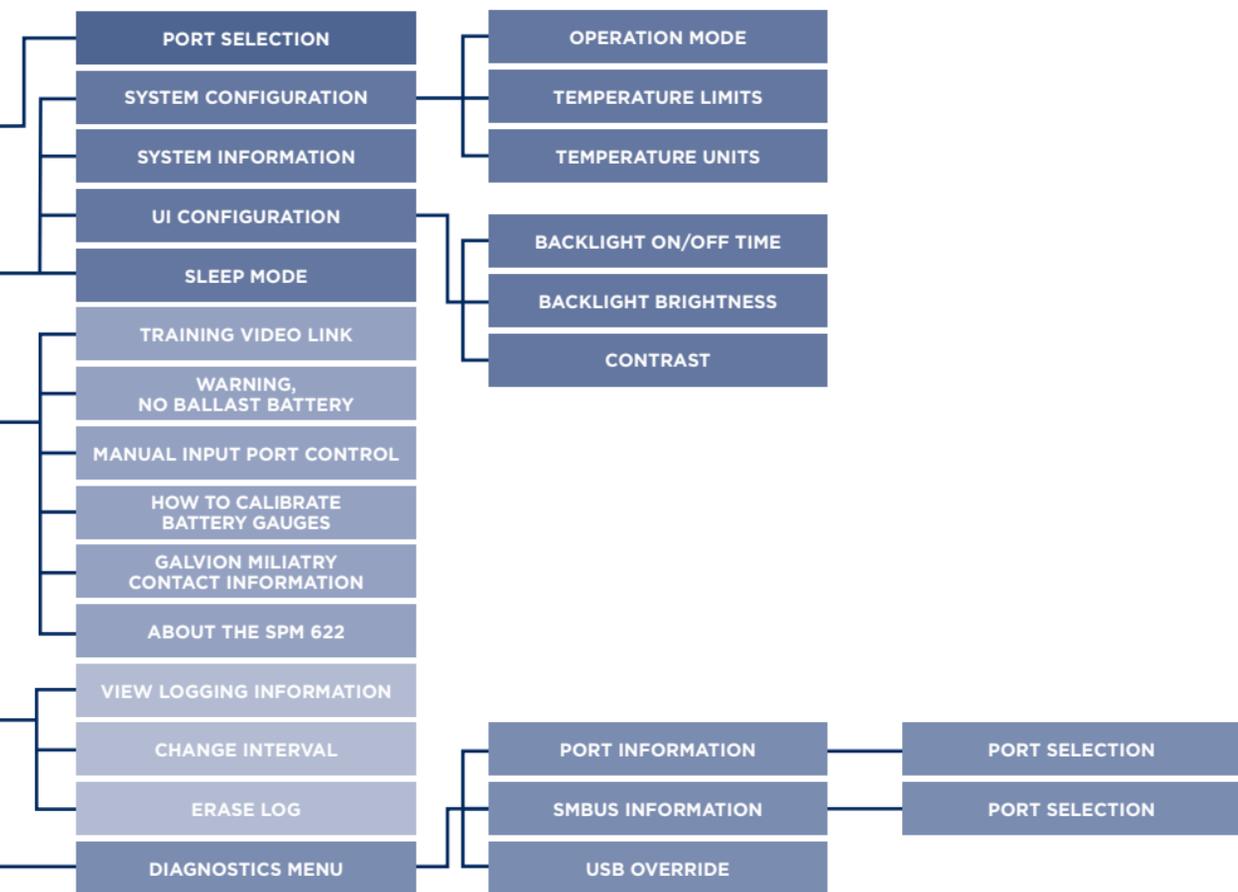


Port 5 Warning
PRC-148 MBITR
Insufficient Power

USING THE DISPLAY AND KEYPAD

USER INTERFACE (UI) MAP





USING DATALOGGING

The SPM Datalogging capability allows users to zero in on how energy is being used. This information allows for better control of power usage and better planning in regards to the amount of energy required for a mission. The SPM records information to an internal datalog every few seconds. This data can then be uploaded to a laptop or PC to analyze power usage.

THE INFORMATION RECORDED INCLUDES:

- Which devices are plugged into which ports on the SPM.
- The voltage, average current and maximum current for each port.
- The state of charge and temperature of an attached battery.
- Any error states.
- A real-time-stamp that includes the date and time of the entry.

The log is kept in a “nonvolatile” memory in the SPM – it will not disappear when power is lost. The memory is large enough to store up multiple weeks of usage information.

DOWNLOAD A LOG

To download a datalog, you must have a USB data cable – a cable that plugs into Port 2 and has a male USB connector to plug directly into a laptop or computer. Data cables are available from Galvion Military and their approved vendors and solution partners (p/n 004-126 or 005-408). Alternatively, a laptop power cable that also has a data port, like the 2A-00172-01 Toughbook cable can be used.

TO DOWNLOAD A LOG:

1. Ensure the Galvion Datalog Reader software is installed on the PC or laptop – if not, obtain and install the software.

2. Connect a battery or other power source to the SPM – do not use Port 2.
3. Connect the data cable from Port 2 to the laptop or PC. The laptop should recognize the power manager USB device automatically.
4. Start the Datalog Reader software.
5. Use the Help function in the Datalog Reader software for support. Under Help, there is a document complete with images to walk you through how to download a datalog.

DATA LOGGING CONFIGURATION

Data logging occurs automatically, but it can be modified to better suit user needs. Users can:

- View the logging information; including if the log is active or disabled and how much space is being used.
- Change the logging interval.
- Erase the log.

RESETTING THE LOG

To quantify the energy used during a particular mission or exercise, clear the SPM's log prior to the mission.

TO RESET THE SPM'S LOG, GO TO THE MAIN MENU › DATA LOGGING › ERASE LOG › ERASE ENTIRE LOG, AND PRESS ENTER.

THE REAL TIME CLOCK

Each entry in the SPM datalog has a time-stamp. The time is set during production and is per Zulu time. The time should remain accurate each year, but can be reset using the Datalog reader application. The application will display the PC's current time (local time zone).

MAINTENANCE

The Squad Power Manager does not require special calibration or maintenance, but should be treated as any other piece of electronic equipment.

BEFORE EACH MISSION

Prior to each mission, visually inspect the SPM, cables and adapters. If dirty, wipe with a clean damp cloth. Dirt in connectors can be washed out with fresh water - allow the connectors to dry thoroughly before use.

If cables are frayed, broken, have bent pins, or exposed conductors, discard them.

Insert each rubber dust cap into the corresponding SPM ports. If dust caps are missing, return your SPM for repair.

PERIODIC SYSTEM CHECK

The system should be checked for full functionality prior to deployment and periodically during use. To test the system, follow this procedure:

1. Connect a battery to the SPM, and verify that the SPM turns on and that the battery is properly recognized.
2. Plug in all cables in your kit. Make sure the SPM recognizes the cable and that it does not report any errors.
3. Clean cables and components if excessively dirty.
4. Replace any cable that is frayed, broken, has bent pins, or is not recognized by the SPM.

BATTERY CALIBRATION

Occasionally, the SPM will report that a connected battery needs calibration. This report originates from the battery indicating that it can no longer accurately estimate its remaining state of charge.

Failing to calibrate a battery will result in inaccurate remaining battery percentage reports, resulting in faulty information being displayed on the screen.

Calibrating a battery is simple: discharge it fully and then recharge it. To quickly run down the battery, leave it connected to the power manager and any operating equipment for a long period of time. Once the power manager turns off (which indicates the battery is dead), connect the SPM to an energy source (AC or vehicle, for example). The battery will then recharge.

Occasionally, a battery that needs calibration will require two discharge-charge cycles to recalibrate.

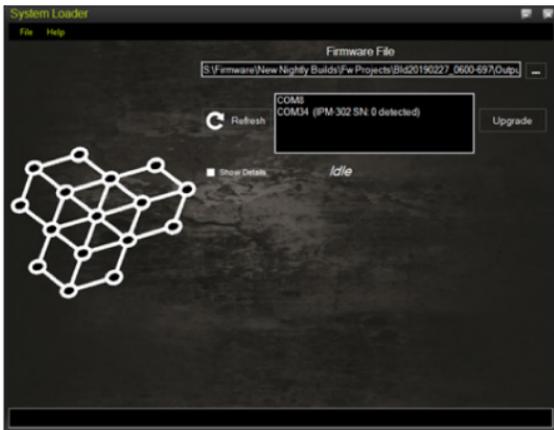
MAINTENANCE

UPGRADING THE FIRMWARE

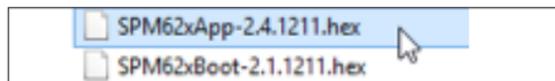
Galvion issues one to two firmware updates per year. Most releases include new capabilities for specific missions. Therefore, a firmware upgrade might not always be necessary. On the other hand, if you notice a problem with your current SPM or are working with Galvion to add new functions to support your specific mission, here's how to upgrade the SPM's firmware:

1. The four items below are required in order to upgrade the SPM's firmware (besides the SPM):
 - a. A SPM data upload/download cable (Galvion p/n 004-126 or 005-408) or a laptop power cable that also has a data port (like the 2A-00172-01 Toughbook cable). This cable connects Port 2 to a laptop or desktop Windows computer's USB port.
 - b. The SPM "**SYSTEM LOADER**" Windows application. This software must be installed on the computer in order to do the upgrade. This software can be requested via the Galvion website. (Alternately, users can download the Nervcentr App from the Android playstore and use their mobile USB cable)
 - c. The hex image of the firmware that will be downloaded on the SPM. This image can be requested via the Galvion website.
 - d. A charged battery and cable to power the SPM.
2. Once all the material listed above is available, plug the SPM into the battery using any port other than Port 2.
3. Via Port 2, connect the SPM to the computer using the data cable from Step 1a. Make sure nothing else is plugged into the SPM.

4. Run the “System Loader” application on the PC.
5. Using the pull-down menu, select the COM port to which the SPM is connected to - the application should provide information on which one to select (COM34 below):



6. Using the “...” button on the right, select the desired firmware image. If both an “**APP**” and a “**BOOT**” image are provided, use the “**APP**”:



7. Click the “**UPGRADE**” button. The upgrade process should take approximately 45 seconds. The SPM will then automatically reset and restart with the new firmware.

TROUBLESHOOTING

COMMON PROBLEMS AND HOW TO SOLVE THEM:

MY SPM WON'T TURN ON.

- Is a battery connected?
- Is the battery charged and operational? Try powering the SPM with something else.
- If the battery is dead, is another energy source (AC or a vehicle) also connected?
- When using a conformal battery, is the black end of the cable plugged into the battery?

I CAN'T POWER MY LAPTOP FROM A SOLAR PANEL.

- Is a battery also connected to the SPM? The power manager requires a battery to stabilize solar operation, and thus will only power very low-power devices when solely using solar energy.
- Is the connected battery dead? If so, charge the battery. The SPM will wait until the battery is about 5% charged before turning on the equipment.

- Is the solar panel unfolded and placed in direct sunlight? Solar energy will not work in even light shade. The blanket does not store energy.

I HAVE A BATTERY AND SOLAR BLANKET CONNECTED, BUT MY SPM SHOWS THAT THE SOLAR BLANKET IS PROVIDING VERY LITTLE POWER.

- Is the battery already fully charged?
- Is the solar blanket in full sun and aimed at the sun?
- Is the battery rechargeable and using a recharging cable?

I CAN'T POWER MY LAPTOP AND RADIO FROM MY CONFORMAL OR RADIO BATTERY.

Many laptops require more power than a small battery can provide – try adding an additional battery or an alternative energy source such as solar or vehicle power into Ports 3 or 4.

MY RADIO DOESN'T COME ON, EVEN THOUGH I THINK I HAVE ENOUGH POWER FOR IT.

Radios require far more power to transmit than to receive. The SPM knows the power needs of most radios, including what they need to transmit. If there isn't enough power available for all connected radios to transmit at the same time, the SPM will power off one or more of them and indicate **"INSUFFICIENT POWER"**. This lets the user know beforehand that there isn't enough power for the mission, rather than having the user find out mid-mission when trying to transmit on multiple radios and have the system die because the battery can't keep up. Add another battery to the SPM (even a little one) and the radio(s) should come on.

CAUTIONS

The SPM may become warm during operation. If the SPM's temperature reaches more than 50°C (122°F), the main screen will display the following message:

"CAUTION: CASE IS HOT. ONLY TOUCH WITH GLOVES"

If the SPM overheats, it will reduce power to charge batteries or may turn off loads in order to reduce its temperature.

CONTACTING GALVION

For technical assistance, or to order replacement or additional cables or adapters, please contact Galvion via e-mail or telephone:

WEB: WWW.GALVION.COM

E-MAIL: CUSTOMERCARE@GALVION.COM

TELEPHONE: 1-508-490-9960

We are open from 8AM to 5PM, Eastern Time, USA.





©2019 GALVION INC. ALL RIGHTS RESERVED. GALVION™, NERV CENTR®, ADAPTIVE BATTERY CHARGER™, SQUAD POWER MANAGER™, SOLOPACK™ AND SHAREPACK® ARE TRADEMARKS OF GALVION INC. OR ONE OF ITS AFFILIATES. GAL2922_0320 EN 007-638 REV7