This shows how we installed 600Ah lithium battery capacity (2x 12V 300Ah LiFePO4 Batteries), added an additional 200-watt solar panel for a total of 400 watts of solar on the roof, and upgraded battery cables to accommodate higher current. I also shortened some battery cables to reduce voltage drop for generator starting, leveler jack operation, and solar harvesting.

Why:

1. We want to reduce the stress of worrying about battery life. Recent 3-day trip to Joshua Tree NP with OEM lead acid batteries and 200 watts of solar on the roof and 220watt portable on the ground, yet we still required generator charging twice a day to keep the batteries above 12.2 volts.
2. While gutting the battery box to accommodate larger batteries; we wanted to upgrade battery cables to prepare for a future 3kw inverter. We are also planning to run the air conditioner from the inverter; which demands short current spikes for when starting the air conditioner compressor.
3. The RV QD3200 generator has always been a challenge to start even when the chassis engine provided a power boost. I suspect the generator glow plug was not receiving enough power due to the voltage drop from 19' of 1/0 cable, a relay, then 14' of AWG 1 cable to the battery.
4. We want to upgrade the direct current power system without sacrificing any storage space.

Who: Having all tools on hand, this project took us 8 half days to install; to include securing and protecting all cabling, sealing all connections and penetrations.

Where:

a. I chose to install the two larger batteries in the existing modified extended house battery box; to retain the original under chassis storage capacity.
b. I was inspired by Darren Ota to install the buss inside the storage bay with the inverter with the plexiglass to protect the components. Because of the larger cable sizes; this is an easier location to install, access and maintain to ensure the connections are tight and clean.
c. I also installed the solar controller inside the same storage bay to reduce voltage drop between controller and batteries.

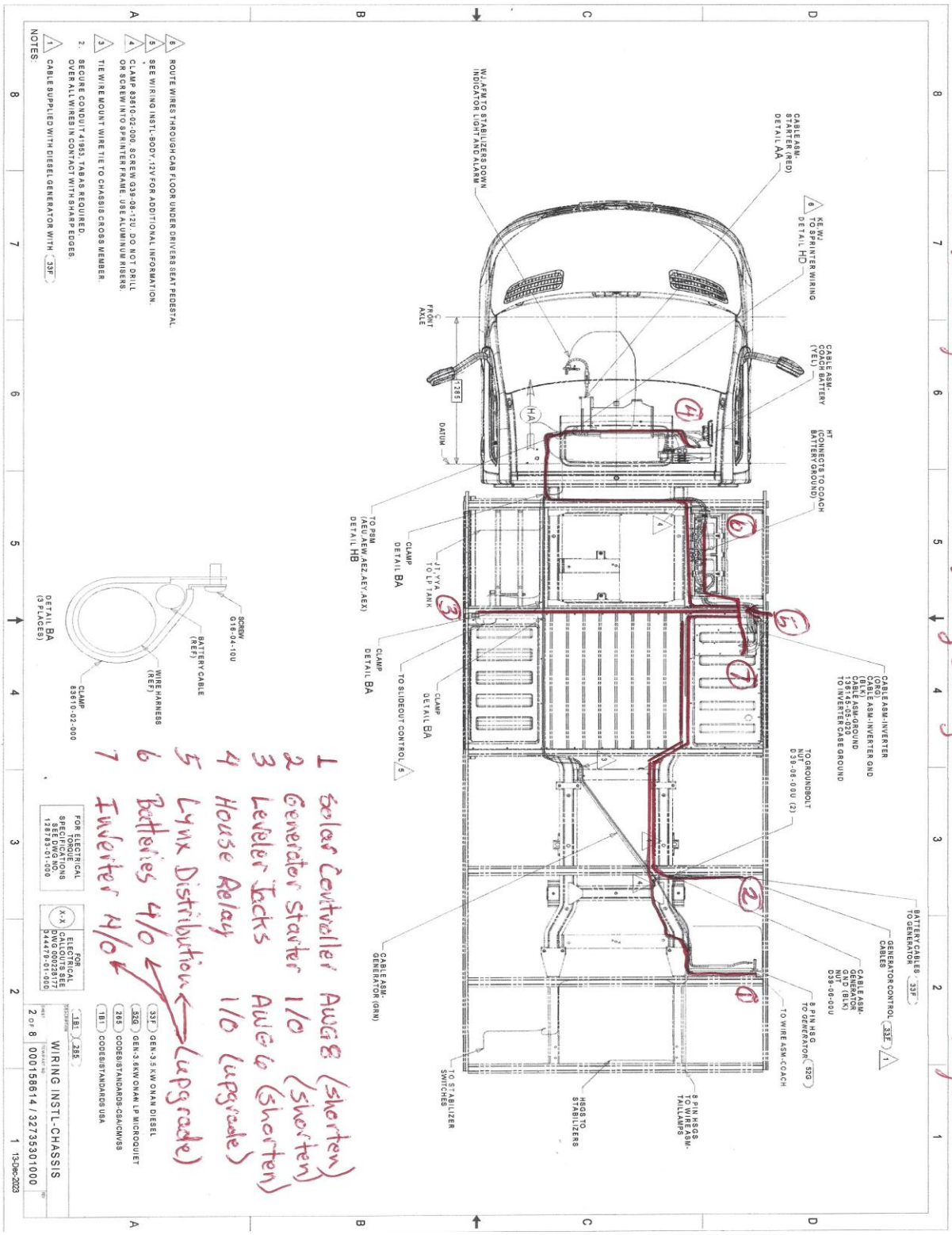
How:

a. Used a reciprocating saw to remove the back end of the battery box. I used zinc plated steel slotted angle to extend the support for the base of the batteries. I installed modified PowerGuard Battery Boxes to protect the bottom and sides of the batteries. Sealed and insulated the outside of the battery box.
b. Mounted ½” plywood to secure the Victron Energy Lynx Distributor, Victron Energy Smart Solar MPPT Solar Charge Controller, and Victron Energy BMV-712 Smart Battery Monitor in the storage bin with the inverter.
c. Relocated one OEM Zamp 100-watt solar panel to the front right of the air conditioner. I installed the Renogy 200-watt solar panel in its place. For a total of 400 watt solar on the roof. We also have a 220-watt portable solar panel available. Note: I removed and re-secured the flare while I was on the roof. Also, touched up the sealant caulking where there was separation, bubbles, or holes.
d. Crawled under the RV to install cable upgrades, remove excess cable, shorten wire runs and made wiring changes (see diagram). Used heavy duty zip ties to secure any sagging cables and to pull cables and hoses away from wheel wells. Installed 3/8” thick plexiglass to protect cables in the storage bin from BBQ grill and accessories.

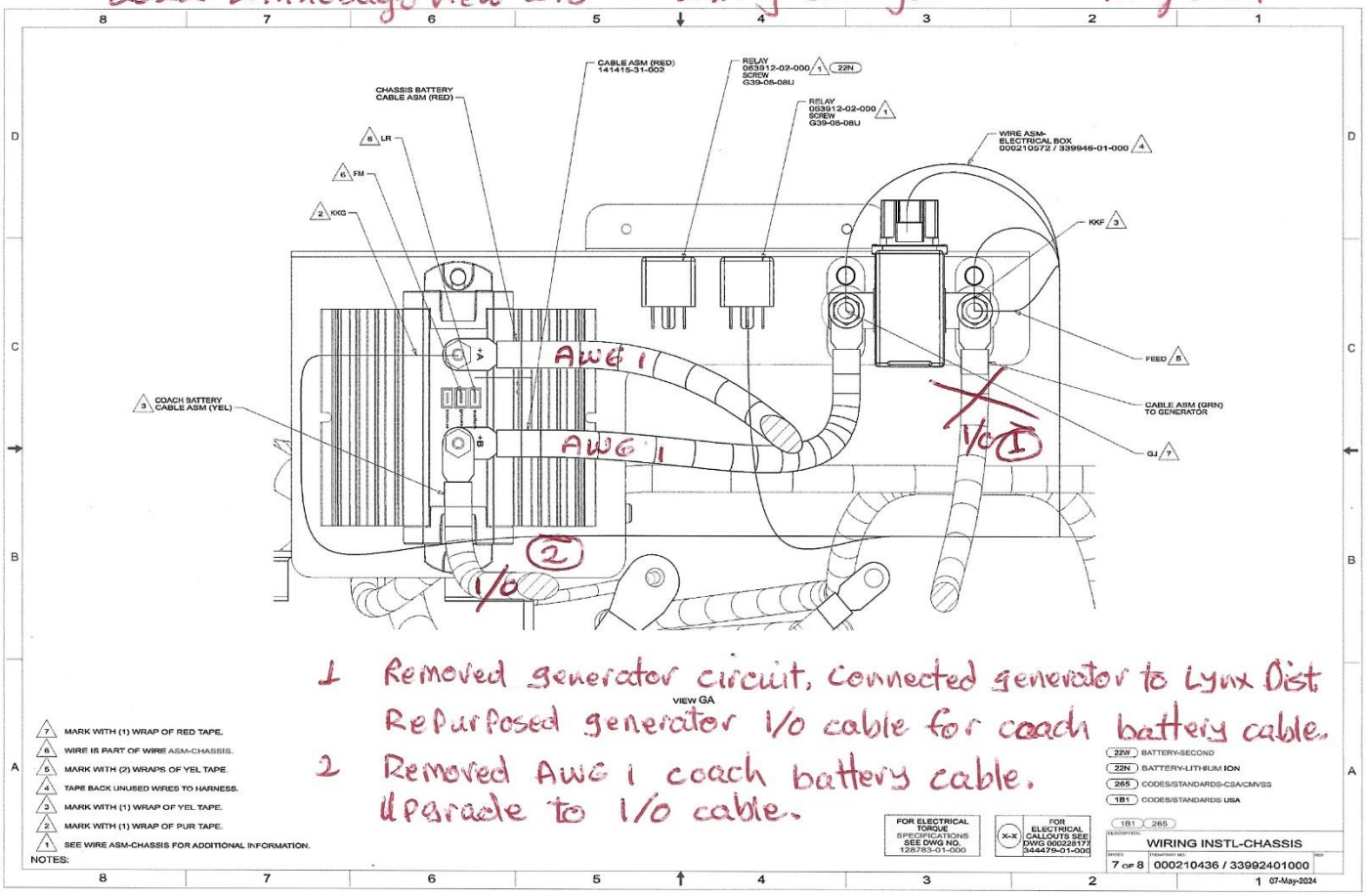
Sources:

a. Fuse sizes: http://assets.bluesea.com/files/resources/newsletter/images/Choose_the_Fuse_Amperage.jpg
b. Cable sizes: https://wiringproducts.com/pages/battery-cable-amperage-capacity-chart
c. Winnebago Wiring Diagrams: https://www.winnebago.com/Files/Files/Winnebago/Resources/Diagram/Wiring.htm

Cable upgrades and wiring changes

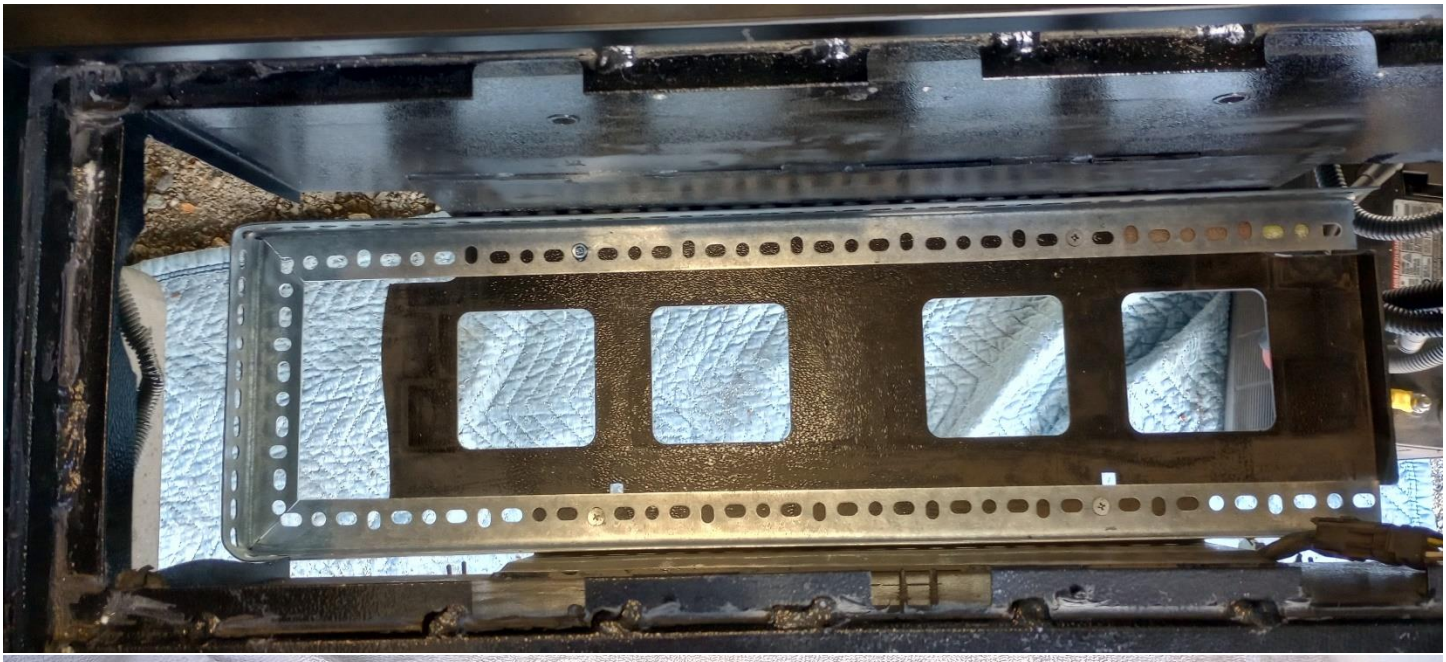


2022 Winnebago View 24D — Cable Upgrades — Wiring Changes — May 2024



1 Removed generator circuit, Connected generator to Lynx Dist. Repurposed generator 1/0 cable for coach battery cable.

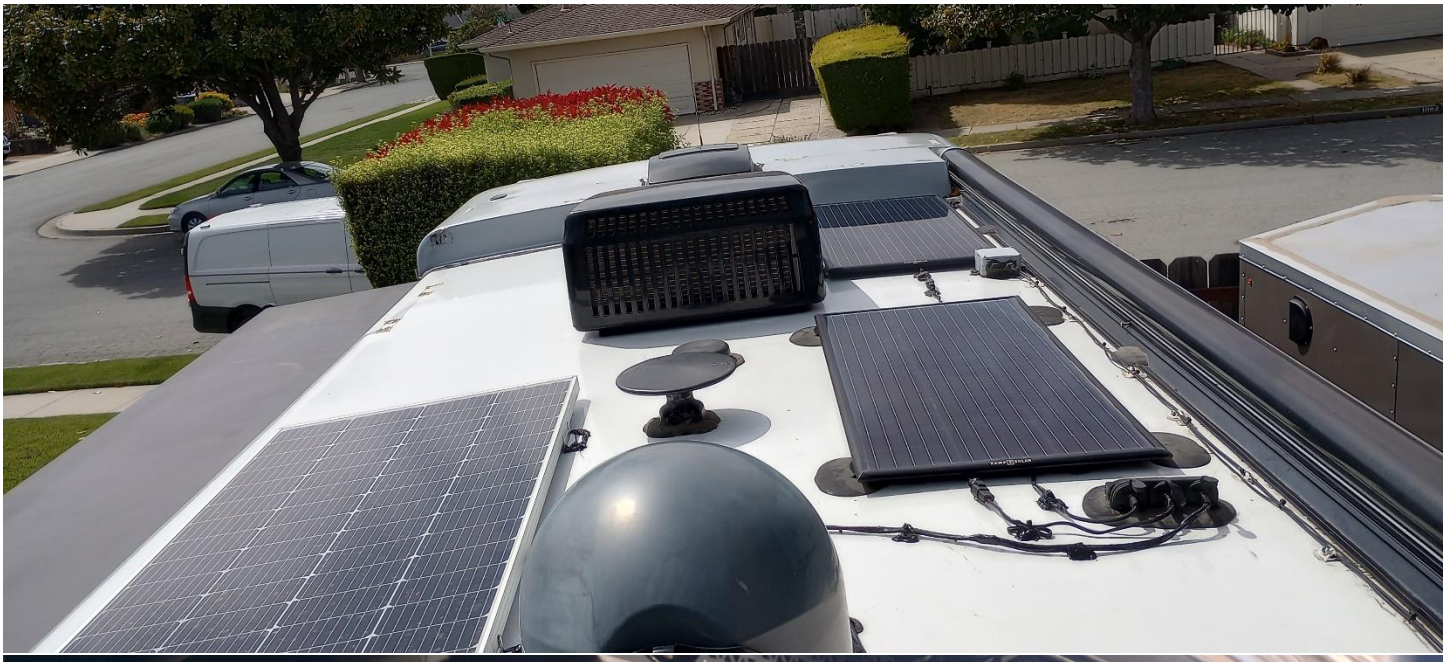
2 Removed AWG 1 coach battery cable. Upgrade to 1/0 cable.

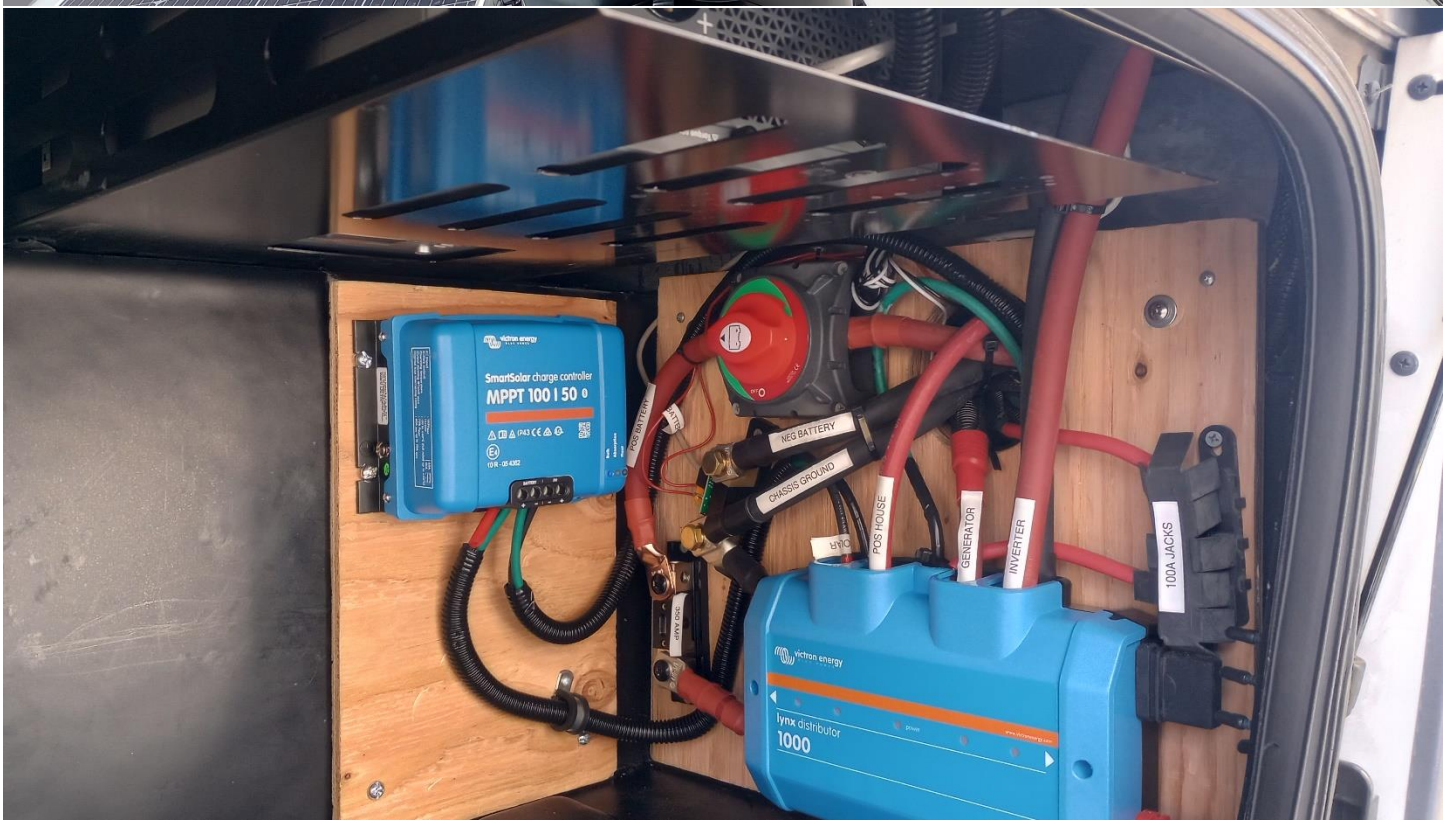



PROFESSIONAL
POWERIC
LITHIUM BATTERY




RAGS
KING tailgater




SmartSolar charge controller
MPPT 100 I 50
NEG BATTERY
CHASSIS GROUND
POS HOUSE
GENERATOR
INVERTER
100A JACKS
victron energy
lynx distributor
1000




MPPT 100 | 50

Products	Description	Price	Purpose
Battery Boxes	PowerGuard Battery Boxes Designed for Marine, RV, Camping	$ 24.00	Modified to contain two batteries end-to-end.
Battery Support	ANGLE SLT ZINC 72X1 1/2X14G, zinc plated steel slotted angle	$ 37.74	Base for mounting batteries.
Battery Warmer	Lion Energy Battery Warmer ($39 each)	$ 70.00	Thermostat turns on at 42 F with a +/- of 5 degrees. It turns off at 68 F with a +/- of 5 degrees. And it only takes 5A when warming the battery and ½ per hour on standby.
Battery, 1/0 Cable	1/0 Gauge EWCS Brand - 25 Feet Red - 100% Copper Premium Industrial Grade Extra Flexible Welding Cable 600 Volt	$ 142.00	Generator starter circuit and Lynx Distributor to Master Volt.
Battery, 1/0 Connectors	1/0 AWG-3/8" Battery Lugs, 10pcs with 3:1 Heat Shrink Tubing	$ 9.96	Generator starter circuit and Lynx Distributor to Master Volt.
Battery, 4/0 Cable	WNI 4/0 AWG 4/0 Gauge 10 Feet Black + 10 Feet Red Battery Welding Pure Copper Ultra Flexible Cable + 5pcs of 5/16" & 5pcs 3/8" Copper Cable Lug Terminal Connectors + 3 Feet Heat Shrink Tubing	$ 170.08	Maximum 440 Amperage. Power Flex Cable is an ultra flexible PURE copper cable manufactured with a tough, solvent resistant EPDM insulation jacket. Victron bus-bar to batteries, and inverter.
Battery, 4/0 Connectors	4/0 AWG-3/8" Battery Lugs, with 3:1 Heat Shrink Tubing	$ 17.66	Lynx Distributor, Batteries, & Inverter.
Battery, LiFeP04 300AH	Paoweric 12V 300Ah LiFePO4 Battery with 250A BMS, Max. 3200W Power,10000+ Cycles, 10-Year Lifespan, Compact Lithium Iron Phosphate Battery ($595.95 Each)	$ 1,191.90	Paoweric 12.8V 300Ah LiFePO4 battery is 13.7 inches long, 7.8 inches wide, 9.8 inches high, weighs about 56 pounds, can provide 3840 Wh energy, load power is 3200W.
Buck, 5V	Buck Converter 6-24V to 5V 1.5A Step-Down Regulator Module Power Inverter Volt Stabilizer	$ 13.88	Modification to power Lynx Distributor LED indictors.
Bus-Bar	Victron Energy Lynx Distributor	$ 201.45	Contains a positive and negative bus-bar and provides a connection for 4 individual DC equipment circuits, loads or DC groups.
Crimping Tool	LICHAMP 16 Packs Hydraulic Cable Lug Tool with durable case, 6 AWG to 4/0 AWG Battery Cable Crimping Tool WIRE Terminal Crimper Set, 1203BL	$ 55.99	Lichamp battery cable crimper is equipped with 8 sets of the crimping dies, with AWG sizes 6, 4, 3, 2, 1/0, 2/0, 3/0, 4/0.
Disconnect, 50A	50A Amp Circuit Breaker with Manual Reset Switch DC 12V-48V	$ 16.99	Solar circuit protection and quick disconnect
Foam, spray	Great Stuff 99112876 Smart Dispenser Multipurpose Black, 12 Oz.	$ 9.98	Fills, seals and insulates gaps up to 3/4"
Fuse 100A	FUSE MEGA 100-AMP 32V	$ 11.79	Leveler jack circuit - Victron Energy Lynx Distributor
Fuse 100A	FUSE MEGA 100-AMP 32V	$ 11.79	Generator starter circuit - Victron Energy Lynx Distributor
Fuse 1A	1A 250V Slow Blow Fuse 5x20mm Cartridge Glass Tube Fuse	$ 6.99	Victron BMV-712 Replacement fuse for main and chassis battery leads.
Fuse 300A	FUSE MEGA 300-AMP 32V	$ 11.64	House DC circuits - Victron Energy Lynx Distributor
Fuse 300A	FUSE MEGA 300-AMP 32V	$ 11.64	Inverter - Victron Energy Lynx Distributor
Fuse 350A & Holder	Inline ANL Fuse Holder with 350 Amp Fuse	$ 12.99	Protection for batteries and 4/0 cable
Fuse 50A	FUSE MEGA 50-AMP 32V	$ 11.79	Solar circuit - Victron Energy Lynx Distributor
Hanger Bolts	1/4-20 x 4 Inch Hanger Bolts 1/4-20" Silvery Double Headed Bolts 1/4 Wood Dowel Screw	$ 7.99	Stand-off to secure plexiglass guard.
Mounting Brackets	Renogy Solar Panel Mounting Z Brackets Lightweight Aluminum Corrosion-Free	$ 15.79	Mounting solar panel
Mounting Tape	Adhesive Mounting Tape Waterproof, 16.4 FT x 0.94 IN, Strong Foam Tape	$ 18.99	Mounting solar panel
Plexiglass	Fab Glass and Mirror Plastic PET 24"x36" (6mm) Thick Acrylic Sheet	$ 52.54	Protect equipment in the storage bay
Plug RJ10	Telephone Modular Plug RJ9/RJ10/RJ22 4P4C Connector	$ 5.59	Modification to power Lynx Distributor LED indictors.
Plywood	1/2 2X2 BC	$ 12.36	Mounting equipment in the storage bay.
Shunt, Smart Battery	Victron Energy BMV-712 Smart Battery Monitor	$ 158.95	Battery monitor can be programmed to measure battery temperature , midpoint voltage, or voltage of a chassis battery, plus a relay that can be programmed to control other devices.
Solar Controller	Victron Energy Smart Solar MPPT 100V 50 amp 12/24-Volt Solar Charge Controller (Bluetooth) (replaces Zamp Solar Controller)	$ 184.45	Suitable for Solar panels up to 750 Watts.
Solar Panel 200W	200 Watt 12 Volt Monocrystalline Solar Panel (add to existing panels already on the roof)	$ 209.99	Renogy Aluminum, 58.7"L x 27.5"W x 1.38"H, 26.46 Pounds, Efficiency 19.2% (Note: I had to relocate one existing panel to fit this larger panel)
Switch 600A	ON Off Battery Switch 12V 24V 48V 600A High Current Heavy Duty Battery Power Cut	$ 35.99	On/Off 2 positions, 600 A continuous at DC 12V, 455 A intermittent at DC 12V, 1250 A momentary at DC 12V.
Terminal Covers	Recoil STC40-4 4 Pack Silicone Terminal Covers for Alternator Battery Stud and Power Junction Blocks, Fits 3/0AWG to 4/0AWG Wire, 2 Red and 2 Black Pairs	$ 11.99	Short protection for battery terminals
Thermostat	W1701 12V DC Temperature Controller Switch Digital Thermostat Adjustable Thermostat Temperature Switch Cooling Controller	$ 9.19	Thermostat for battery heat pads.
Wing Nuts	1/4-20-Inch Stainless Steel Wing Nut, 5-Pack	$ 5.80	Removable nut to secure plexiglass guard.
Zip Ties	18 inch Black Zip Ties Heavy Duty Double Sided Toothed 100 Pack, 250 LBS Ultra Strong Plastic Wire Ties	$ 16.99	Securing undercarriage cabling.
		$ 2,786.87	

Already Installed (by Winnebago or Owner)			
Chassis Battery Charger	Xantrex 82-0123-01 Echo Charge for 12 & 24V Systems	Owner Installed	Chassis battery charging system with engine off. 12.8 - 13.3 V
Solar Panels 100W	2x 100 watt ZAMP solar panels	OEM	
Inverter 2000W	Xantrex Freedom XC Inverter Charger XC 2000 817-2080 2000W Inverter / 80A Battery Charger	OEM	Freedom XC 2000 inverter/charger provides continuous utility grade, sine wave power derived from the house battery bank. The built-in transfer switch automatically transfers between inverter power and shore power. Output voltage options 120, 110, 108 VAC. Continuous power 2000 W @ 40 °C. Continuous current 16.7 A. Surge power (5 sec) 4000 W. Max output voltage 18.0 VDC (custom battery type). Nominal output current User selectable: 5 to 80A. Charger current is rated to 14.4 VDC output only.
Relay, Electronic Charge	Master Volt Charge Mate Pro 40	OEM	Charge current to house battery limited to 40 Amps. Makes it possible to distribute the charger or alternator current effectively between two battery banks such as a starter and a service battery. Connects both batteries during charging and keeps them isolated when discharging. Suitable for charging from AGM/GEL starter batteries to AGM/GEL/Lithium service batteries.
Monitor Panel	One Place Monitor Panel digitally displays the levels of the Batteries, Water Tank, Waste Tanks, & L.P. Tank.	OEM	Digitally displays the levels of the Water & Waste Tanks, & L.P. Tank. It provides both a digital and analog Battery Volt Meter. It also controls the Water Pump.