

# POWER FOR MANPACKED RADIO COMMUNICATIONS EQUIPMENT



**" IN EVERY CLIME AND PLACE "**

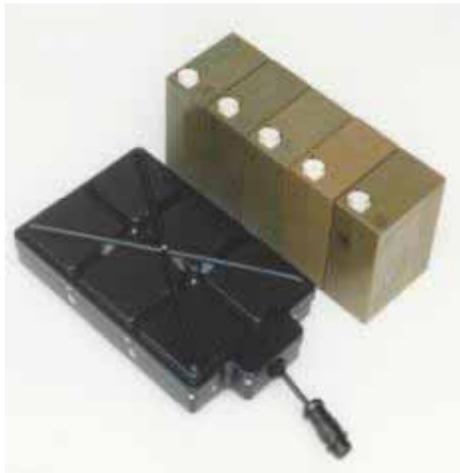
**AUGUST 09**

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# PURPOSE

Welcome to the Program Manager (PM), Expeditionary Power Systems (EPS) guide for powering Battery Operated Radio Systems. The purpose of this guide is to review battery options, power supplies, inverters, and alternative power devices that are available to the Warfighter.



**Published by the  
Program Manager,  
Expeditionary Power Systems,  
Marine Corps Systems Command  
on 10 August 2009.**

## **NOTICE TO USER**

This publication does not replace equipment TM's or battery Material Safety Data Sheets (MSDS).



## **HOW TO USE THIS GUIDE**

This guide reviews the most commonly used radio systems and alternative power options to include SINCGARS 12V radios, 24V radios (AN/PRC-150 and AN/PRC-117), the AN/PRC-148 (MBITR), the AN/PRC-152 (FALCON) and the AN/PRC-153 (IISR) radios.

For other radio systems identify the primary battery used and check page 20 to determine if a rechargeable alternative is available. You can also use the POWER OPTIMIZER battery planning tool shown on page 41 to identify alternative batteries and calculate battery requirements.

In order to be effective on the battlefield, a unit must be able to Move, Shoot and Communicate. Early into the invasion of Iraq, severe shortages of BA-5590/U batteries almost delayed combat operations. Units can mitigate future shortages by training with and employing alternative power.

## **BECOME BATTERY INDEPENDENT**

Request additional copies of this guide by  
sending an email to [pm\\_eps@nmci.usmc.mil](mailto:pm_eps@nmci.usmc.mil)

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(732) 532-4948

Send requests to  
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pm\_eps@nmci.usmc.mil

# ALTERNATIVE POWER WEB SITES

U.S. Marine Corps  
Program Manager  
Expeditionary Power Systems  
Marine Corps Systems Command

[www.marcorsyscom.usmc.mil/sites/pmeps](http://www.marcorsyscom.usmc.mil/sites/pmeps)

U.S. Army  
Rechargeable Battery  
Program

[www.monmouth.army.mil/cecom/lrc/lrchq/power/rechargebat.html](http://www.monmouth.army.mil/cecom/lrc/lrchq/power/rechargebat.html)



**Introduction, NSNs and Prices**  
**DA Rechargeable Battery Policy . . .**

**It's Time to get all "Charged up"**



# BATTERY SAFETY

When used incorrectly or mishandled, batteries can be hazardous.



Do not take batteries apart – reduce the likelihood of becoming a “battery incident” statistic.

Material Safety Data Sheets (MSDS) should be on hand and displayed in the work area for each type of battery.



# LITHIUM BATTERY SAFETY PROGRAM

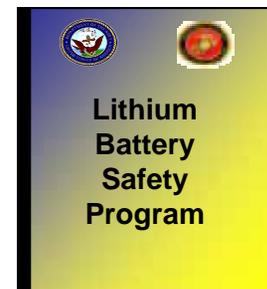
Lithium based batteries, to include Sulfur Dioxide (LiSO<sub>2</sub>), Lithium Manganese (LiMn), and Lithium Ion (Li-Ion) have special Development, Testing, Handling, Logistics Support, and Disposal Guidance due to their greater chemical volatility.

Lithium based batteries are used throughout the Department of Defense in numerous weapons and communication systems. Special guidance is in effect from several governing or controlling bodies, as they apply to and impact USMC implementation.

All Lithium batteries and products containing Lithium batteries must be reviewed, tested and approved as directed under the Navy Lithium Safety Program before being introduced into the operating forces. Lithium batteries DO NOT receive a blanket approval. Lithium batteries are approved for use in specific equipment only.

The procedures for requesting a Lithium Battery Safety Approval are outlined in MCSC Acquisition Policy Letter NO. 3-04 dated 17 August 04 and NAVSEAINST 9310.1B. Both are available on the PM EPS web site at:

<http://www.marcorsyscom.usmc.mil/sites/pmeps>



Look under [MEP & Battery Policy](#)

# SINGARS 12V RADIO POWER OPTIONS

## BATTERY OPTIONS

BA-5590B/U	Page 15 & 19
BA-5590A/U W/SOCI	Page 15 & 19
BA-5390/U	Page 15 & 19
BA-5390A/U W/SOCI	Page 15 & 19
BA-8140/U*	Page 17 & 19
BA-8180/U*	Page 17 & 19
BB-390B/U	Page 20 & 22
BB-2590/U	Page 20 & 22



### NOTE 1

The SSPA will not work with the AN/PRC-119F.

## POWER ADAPTER OPTIONS

SSPA (PAC-216) Note 1	Page 33
MSPA (ASAPS-6)	Page 33
MRPA (ASAPS-SC)	Page 33
SPACES	Page 38



\*J-6633/U 119 FEI ASIP  
(119 F) Adaptor  
NSN 5940-01-504-3218



\*J-6634/U SINGARS  
(119 B) Adaptor  
NSN 5940-01-504-5597

# AN/PRC-148 (MBITR) RADIO POWER OPTIONS

## BATTERY OPTIONS

MBITR Battery	Page 20 & 23
BA-8140/U	Page 17 & 19
BA-8180/U	Page 17 & 19

## POWER ADAPTER OPTIONS

Battery Cell Holder	Page 8
SPACES	Page 38
HH-RPA	Page 35 & 36
DVA	Page 8

The MBITR battery is a unique rechargeable battery manufactured by Thales Inc. When initially fielded the only battery charger to support the MBITR battery was the Thales AC/DC commercial charger. Adapters have been developed to allow use of the SPC and VMC chargers (page 26) to charge the MBITR battery.



BB-MBITR  
Li-Ion Battery  
6140-01-487-1153\*\*



Thales AC/DC Charger  
6130-01-504-3675



Dual Vehicle Adapter  
(DVA) AN/VRC-111  
5820-01-557-8450



Battery Cell Holder  
6130-01-504-3675  
holds 12 DL123A or  
BA-5123 batteries

**\*\*NO other "Twist On" Battery NSN is currently authorized for use with the MBITR. Page 8**

# AN/PRC-152 FALCON RADIO POWER OPTIONS

## 7.5 VDC AN/PRC-152 (FALCON)

### BATTERY OPTIONS

FALCON Battery	Page 20 & 23
BA-8140/U*	Page 17 & 19
BA-8180/U*	Page 17 & 19

### POWER ADAPTER OPTIONS

SPACES	Page 38
HH-RPA	Page 35
DVA	Page 9



AN/VRC-110 Dual Vehicle Adapter  
5895-01-571-7461 DVA without radios  
5820-01-565-9999 DVA with radios

The FALCON battery is a unique rechargeable battery manufactured by Harris. The only battery chargers fielded to support the FALCON are the AC Harris commercial chargers. Adapters have been developed to allow use of the SPC and VMC chargers (page 26) to charge the FALCON battery.



Li-Ion Battery  
6140-01-548-7566

\*J-6686/U  
Adaptor  
5940-01-517-3990

Harris AC Chargers

# AN/PRC-153 IISR RADIO POWER OPTIONS

## 7.5 VDC AN/PRC-153 (IISR)

### BATTERY OPTION

IISR Battery

Page 20 & 23

### POWER ADAPTER OPTIONS

SPACES

Page 38

HH-RPA

Page 35 & 36



Motorola AC  
Charger



BB-IISR  
Li-Ion Battery  
6140-01-548-7367



IISR Radio

The IISR battery is a unique rechargeable battery manufactured by Motorola. The only battery chargers fielded to support the IISR are the AC Motorola commercial chargers. Adapters have been developed to allow use of the SPC (page 26) to charge the IISR battery. Future upgrades for the VMC charger will include the IISR battery adapter.

# 24 VOLT RADIO POWER OPTIONS

## AN/PRC-117F, AN/PSC-5, and AN/PRC-150

### BATTERY OPTIONS

BA-5590B/U	Page	15 & 19
BA-5590A/U W/SOCI	Page	15 & 19
BA-5390/U	Page	15 & 19
BA-5390A/U W/SOCI	Page	15 & 19
BA-8180/U*	Page	17 & 19
BB-390B/U	Page	20 & 22
BB-2590/U	Page	20 & 22



### POWER ADAPTER OPTION

MRC-93 Single RPA                      Page 34

\*J-6687/U  
SATCOM/HFEI Adaptor  
5940-01-516-9787



Next generation 24V RPA Tower configuration planned for FY10.  
Next generation 24V Single RPA replacement planned for FY11.

# AA RECHARGEABLE BATTERY OPTIONS



The PowerFilm AA Foldable Solar Battery Charger charges 2 or 4 AA MiMH or NiCd batteries. For additional information contact [pm\\_eps@nmci.usmc.mil](mailto:pm_eps@nmci.usmc.mil).

RESEARCH • DEVELOPMENT • ENGINEERING • SUPPORT

## CERDEC ARMY POWER DIVISION

### 8 PACK SCAVENGER - A Battery Charger

**Issue:**

- Large Battlefield AA Battery Requirements
- Cost of Disposable AA Batteries

**Solution:**

- 8 Pack Scavenger – Charges up to 8 COTS Rechargeable AAs in 100 Minutes Utilizing Remaining Energy from Army Batteries
- NSN 6130-01-539-0646

**8 Pack Scavenger Sources:**

Charging Sources	# of AA-cells Charged
BA-8180	128
BA-8140	64
BA-5590	24
BA-5390	32
BB-390	20
BB-2590	24
SP4-solar panel	∞
Vehicle Adapters	∞

**Battlefield Recharging of AA Batteries**

*Scavenges Unused Energy from Military Batteries*

our Web Site [http://commandandcontrol.mosbyouth.army.mil/ams\\_power.htm](http://commandandcontrol.mosbyouth.army.mil/ams_power.htm)

the warfighter quicker

The Scavenger is a battery charger that takes the remaining unused energy from military batteries and uses it to charge up to eight commercial AA batteries, NSN 6130-01-539-0646.



The J-6589/P is a AA battery adapter for the SPC charger that allows recharging of AA Nickel Hydride batteries. See page 28 for NSN.

# FAMILY OF MIL SPEC PRIMARY BATTERIES



BA-5590B/U  
12/24V  
Li-SO<sub>2</sub>



BA-5372/U  
6V Li-MnO<sub>2</sub>



BA-8180/U  
12/24V  
Zinc-Air



BA-5368/U  
12V Li-MnO<sub>2</sub>



BA-5390/U  
12/24V  
Li-MnO<sub>2</sub>



BA-5800A  
6V Li-SO<sub>2</sub>



BA-5600A/U  
9V Li-SO<sub>2</sub>



BA-5374/U  
6V Li-MnO<sub>2</sub>



BA-5347/U  
Li-MnO<sub>2</sub>



BA-5367/U  
3V Li-MnO<sub>2</sub>

# FAMILY OF MIL SPEC PRIMARY BATTERIES



BA-5567A/U  
3V Li-SO<sub>2</sub>



BA-5847/U  
6V Li-SO<sub>2</sub>



BA-5598A/U  
12V Li-SO<sub>2</sub>



BA-8140/U  
12V Zinc-Air



BA-5557A/U  
12/24V Li-SO<sub>2</sub>



BA-5112A/U  
12V Li-SO<sub>2</sub>



BA-5588A/U  
12V Li-SO<sub>2</sub>

# MILITARY 'WORKHORSE' STANDARD NON-RECHARGEABLES

**These batteries are not just for SINCGARS anymore!**

While commonly known as SINCGARS batteries, they support over 75 different weapon systems ranging from mine detectors to missile launchers.

DLA has recently stocked new models of the BA-5590B/U and BA-5390/U which are the BA-5590A/U and the BA-5390A/U. These new models, shown below, have State of Charge (SOC) LED Indicators.



State of Charge (SOC) Indicators allow users to fully utilize battery capacity by displaying the remaining battery capacity in segments from 0% to 100%.

## DIFFERENCES BETWEEN NON-RECHARGEABLE BATTERIES



### BA-5590

- Lithium Sulfur Dioxide
- Lighter
- Lower unit cost
- Better in Cold Climates < 70F

### BA-5390

- Lithium Manganese Dioxide
- Higher capacity (lasts longer)
- Better in Hot climates > 70F



The most common battery is the BA-5590 Lithium Sulfur Dioxide. An alternative is the BA-5390/U Lithium Manganese Dioxide battery. The BA-5390/U provides approximately 40 percent more run time than the BA-5590B/U, but costs and weighs more.

# ZINC-AIR PRIMARY BATTERIES

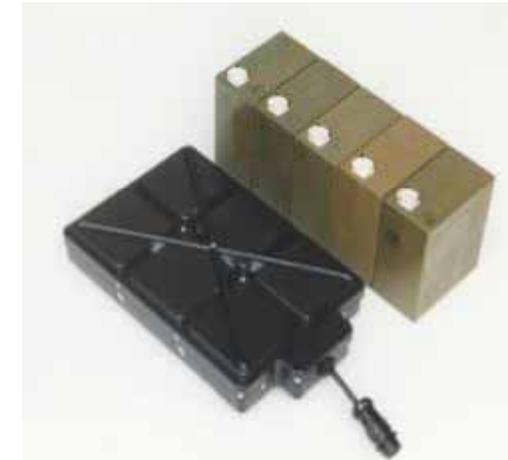
## SAMPLE PERFORMANCE TIMES

EQUIPMENT	BA-8180/U	BA-8140/U
SATCOM HF	5-7 Days	N/A
MBITR (PRC-148)	14 Days	7 Days
AN/PRC-119F	5-10 Days	4-6 Days
SINCGARS (A-E)	5-9 Days	4-6 Days



BA-8140/U 12 VOLT  
400 watts - Three pounds

Zinc-air batteries require special adapters. These adapters are re-usable.



BA-8180/U 12/24 VOLT  
800 watts - Six pounds



BA-8180 Zinc-air Battery and Adapter  
J-6687/U energizing a 24V radio.

Zinc-air batteries are activated by breaking the plastic seal and exposing them to air. They must remain exposed to air and will not work if submerged under water. When returned to storage, Zinc-air batteries must be resealed in plastic or they will continue to generate power and will self discharge to zero while in storage.

# ADAPTERS FOR ZINC-AIR PRIMARY BATTERIES



**J-6686/U  
AN/PRC-148**

**J-6633/U  
SINGGARS  
FOX ASIP**

**J-6632/U 12  
Volt Options**

**J-6685/U  
M22 Adapter**

**J-6687/U  
24V Adapter  
for the  
PRC-117 &  
PRC-150**

ADAPTER	APPLICATION	NSN	PRICE 09	U/I
J-6632/U	12 Volt Options	5940-01-504-3217	\$59.41	EA
J-6633/U	AN/PRC-119F ASIP	5940-01-504-3218	\$122.74	EA
J-6634/U	AN/PRC-119(A-E)	5940-01-504-5597	\$56.40	EA
J-6685/U	M22 Adapter	5940-01-516-9785	\$106.00	EA
J-6686/U	PRC-148/PRC-152	5940-01-517-3990	\$215.00	EA
J-6687/U	SATCOM/HF	5940-01-516-9787	\$476.00	EA
J-6688/U	JAVELIN Adapter	5940-01-517-1026	\$425.00	EA



**J-6634/U  
SINGGARS A-E**

# PRIMARY BATTERY REFERENCE CHART

NEW TYPE	NEW NSN	U/I	FY09 PRICE	OLD TYPE	OLD NSN	OLD U/I
BA-5093/U	6135-01-216-9771	EA	\$113.08	N/A	N/A	N/A
BA-5372/U	6135-01-214-6441	PG (10ea)	\$94.09	BA-1372	6135-00-801-3493	PG
BA-5312/U	6135-01-528-0699	PG (4ea)	\$331.85	BA-5112A/U	6135-01-439-6229	EA
				BA-5112	6135-01-235-4168	EA
BA-5557A/U	6135-01-448-4680	PG (4ea)	\$405.87	BA-5557	6135-01-088-2707	EA
BA-5367/U	6135-01-507-1135	PG (12ea)	\$83.49	BA-5567	6135-01-090-5365	PG
				BA-1567	6135-00-485-7402	PG
				BA-5567A/U	6135-01-447-5082	PG
BA-5588A/U	6135-01-447-5083	PG (5ea)	\$200.19	BA-5588	6135-01-088-2708	EA
BA-5590B/U	6135-01-438-9450	PG (4ea)	\$321.26	BA-5590	6135-01-036-3495	EA
BA-5590A/U	6135-01-523-3037	PG (4ea)	\$588.06	N/A	N/A WITH SOC LED	N/A
BA-5390/U	6135-01-501-0833	PG (4ea)	\$488.81	N/A	N/A	N/A
BA-5390A/U	6135-01-517-6060	PG (4ea)	\$532.00	N/A	N/A WITH SOC LED	N/A
BA-5598A/U	6135-01-447-5081	PG (4ea)	\$205.81	BA-5598	6135-01-034-2239	EA
BA-5599A/U	6135-01-447-4001	PG (4ea)	\$167.21	BA-5599	6135-01-069-8575	EA
BA-5600A/U	6135-01-441-0402	PG (8ea)	\$314.05	BA-5600	6135-01-168-2944	EA
BA-5800A	6135-01-440-7774	PG (8ea)	\$199.73	BA-5800	6665-99-760-9742	EA
BA-5347/U	6135-01-455-7946	EA	\$49.40	BA-5347	N/A	N/A
BA-5368/U	6135-01-455-7947	PG (10ea)	\$307.49	BA-1568	6135-00-838-0706	EA
BA-5374/U	6135-01-455-9646	PG (10ea)	\$130.36	BA-1574	6135-00-073-8939	EA
BA-8140/U	6135-01-517-0952	EA	\$262.00	12V BTRY	ADAPTERS REQ	N/A
BA-8180/U	6135-01-500-0572	EA	\$389.68	12/24 VOLT	ADAPTERS REQ	N/A

**WARNING – ensure personnel are using the correct NSN's and units of issue.  
Many units of issue changed from EA (1) to PG (4), (5), (8), (10) or (12).**

# RECHARGEABLE BATTERY REFERENCE CHART

BATTERY NAME	EQUIVALENT	BATTERY NSN	U/I	FY-09 PRICE	SPC ADAPTER	VMC ADAPTER
BB-2590/U	BA-5590/5390	6140-01-490-4316	EA	\$313.13	J-6358B/P	J-6520A/U J-6581/U
BB-390B/U	BA-5590/5390	6140-01-490-4317	EA	\$271.33	J-6358B/P	J-6520A/U J-6581/U
BB-388A/U	BA-5588	6140-01-490-4313	EA	\$75.68	J-6357A/P	J-6520A/U
BB-2588/U	BA-5588	6140-01-493-7623	EA	\$83.05	J-6357A/P	N/A
BB-326/U	BB-516A/U	6140-01-533-7674	EA	\$115.34	J-6356/P	J-6520A/U
BB-503A/U	N/A	6140-01-419-8193	EA	\$97.40	J-6355/P	N/A
BB-2847A/U	BA-5347	6140-01-493-8092	EA	\$103.84	J-6354/P	J-6520A/U
BB-557/U	BA-5557	6140-01-071-5070	EA	\$102.60	J-6523A/P	J-6584/U
BB-2557	BA-5557	6140-01-490-5387	EA	\$171.78	J-6523A/P	J-6584/U
BB-2600A/U	BA-5600	6140-01-490-4311	EA	\$178.83	J-6521/P	J-6584/U
BB-2800/U	BA-5800	6140-01-490-5372	EA	\$142.64	J-6587/P	J-6520A/U
AA Rechargeables	AA's	Note 1	EA		J-6589/P	N/A
BB-PRC-148 MBITR		6140-01-487-1153	EA	\$299.31	J-6588/P	J-6586/U
BB-PRC-152 FALCON		6140-01-548-7566	EA	\$270.00	J-6878/P	J-6585/U
BB-PRC-153 IISR		6140-01-548-7367	EA	\$120.00	J-6879/P	N/A

Note 1: Any Nickel Metal Hydride AA Rechargeable

**WHY WORRY ABOUT BATTERIES OR ALTERNATIVE POWER ?**

**“RADIOS, TARGET DESIGNATORS, WEAPON SIGHTS, NIGHT VISION, NBC ALARMS”**

# FAMILY OF MIL SPEC RECHARGEABLE BATTERIES



**BB-390B/U**  
12/24V NiMH



**BB-2590/U**  
12/24V Li-Ion



**BB-326/U**  
(Replaces BB-516)  
24V NiMH



**BB-388A/U**  
13.2V NiMH



**BB-516A/U**  
24V NiCad



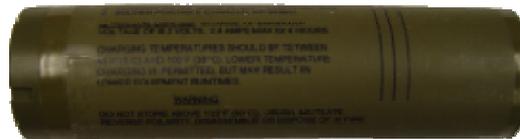
**BB-503A/U**  
4.8V NiCad



**BB-557/U**  
12/24V NiCad



**BB-2600A/U** 8V Li-Ion



**BB-2800/U** 6V Li-Ion



**BB-2847A/U**  
8V Li-Ion

For the AN/PRC-148 (MBITR), AN/PRC-152 (FALCON), and AN/PRC-153 batteries see page 23.

# MILITARY 'WORKHORSE' STANDARD RECHARGEABLE BATTERIES

## Preferred



## BB-2590/U

- Lithium-Ion.
- 1 pound less.
- SINGGARS: 33 hrs.
- No conditioning.
- Low Self Discharge.
- Better in high temps.

## BB-390B/U

- Nickel Metal Hydride.
- SINGGARS: 18 hrs +.
- Requires conditioning.
- Only Rechargeable for JAVELIN and GD (Old) SINGGARS.



The BB-390B/U and the BB-2590/U are warranted. Check the manufacturing date and terms written on the battery. The first digit is the month, the second is the year. This date starts the warranty clock.

## NOTE

The BB-2590/U is NOT APPROVED for use in the Javelin Command Launch Unit. The higher voltage of the BB-2590/U will damage the CLU control unit.

# MOST WIDELY USED COMMERCIAL MILITARY UNIQUE RECHARGEABLE BATTERIES



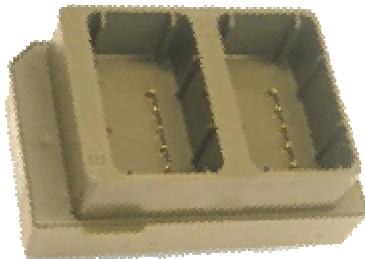
AN/PRC-148 MBITR  
Lithium-Ion Rechargeable  
NSN 6140-01-487-1153



AN/PRC-152 FALCON  
Lithium-Ion Rechargeable  
NSN 6140-01-548-7566



AN/PRC-153 IISR  
Lithium-Ion Rechargeable  
NSN 6140-01-548-7367



SPC adapter J-6588  
supports the  
AN/PRC-148 MBITR



SPC adapter J-6878/P  
supports the  
AN/PRC-152 FALCON



SPC adapter J-6879/P  
supports the AN/PRC-153  
IISR

# PP-8497/U (BB-390) SELF-DISCHARGE DEVICE (DISCHARGE CAP) NSN 6130-01-490-4310



Solid Black (Old)



Solid Tan (New)

## Any discharge cap can:

- Discharge (condition) the BB-390 battery.
- Reset the BB-390 SOC indicators.
- Provide a quick check to BB-390 or BB-2590 to ensure both 12-volt sections are working.

**Note: BLACK CAP's can not be used to discharge the BB-2590/U.**

## BATTERY CHARGERS

### PP-8333/U BATTERY CHARGER/ANALYZER A7700 6130-01-341-2073



Requires periodic calibration. SL-3 cables support the BB-516, BB-586, BB-557, BB-390B/U, BB-588, and BB-699. Other cables are available (refer to PP-8333/U data sheet in TM-12359A-OD). Programmable for other batteries. Will not charge the BB-2590/U. Requires MI-09591A-25/1B for the BB-390B/U.

### PP-8444/U UNIVERSAL BATTERY CHARGER NO LONGER AVAILABLE



Never officially fielded.  
No longer supportable.  
WILL NOT charge the BB-2590/U.  
Replaced by the SPC.

**If you have PP-8444 chargers in your unit, dispose of them as soon as you have enough SPC chargers to meet mission requirements.**

## BATTERY CHARGERS

**PP-8498/U SOLDIER  
PORTABLE CHARGER  
A0012 6130-01-495-2839**



Charges up to eight batteries in approximately 8 hours. Operates from AC or DC. Comes with AC cable, DC cable must be ordered. Will charge the BB-2590/U. Software upgradeable. The SPC comes with four BB-2590/U adapters.

**SPC adapters page 28.**

Both the SPC & VMC are equipped with VEH (vehicle) battery low voltage detection & cutoff protection.

**PP-8481B/U VEHICLE  
MOUNTED CHARGER  
H6002 6130-01-527-2726**



Mounts in a tactical vehicle. Charges two batteries at a time and moves to the next two in queue. Operates from DC or AC. Comes with AC & DC cables. Will charge the BB-2590/U. Software upgradeable.

**VMC adapters page 28.**

# ALTERNATIVE POWER EQUIPMENT

## TECHNICAL PUBLICATIONS

EQUIP NOMENCLATURE	PUBLICATION TYPE	PUBLICATION CONTROL NUMBER
QP-1800 INVERTER	SL-3-11460A	123 114600 00
QP-1800 INVERTER	TM 1460A-OR/1	500 114600 00
SOLDIER PORTABLE CHARGER	SL-3-11099A	123 110990 00
SOLDIER PORTABLE CHARGER	TI-11099A-OI	166 1109900 00
SOLDIER PORTABLE CHARGER	TM 11099A-OI	500 110990 00
VEHICLE MOUNTED CHARGER	SL-3-11100B	123 111001 00
VEHICLE MOUNTED CHARGER	TI-11100B-OI	166 111011 00
VEHICLE MOUNTED CHARGER	TM	
MULTI-SINCHARS POWER ADAPTER	SL-3-10908A	123 109080 00
MULIT-RADIO POWER ADAPTER	SL-3-10911A	123 109110 00
SINGLE SINCGARS POWER ADAPTER	SL-3-10912A	123 109120 00
ASAPS-6	TM 10908A-OI/3	184 109082 00

# SPC/VMC ADAPTER CROSS REFERENCE TABLE

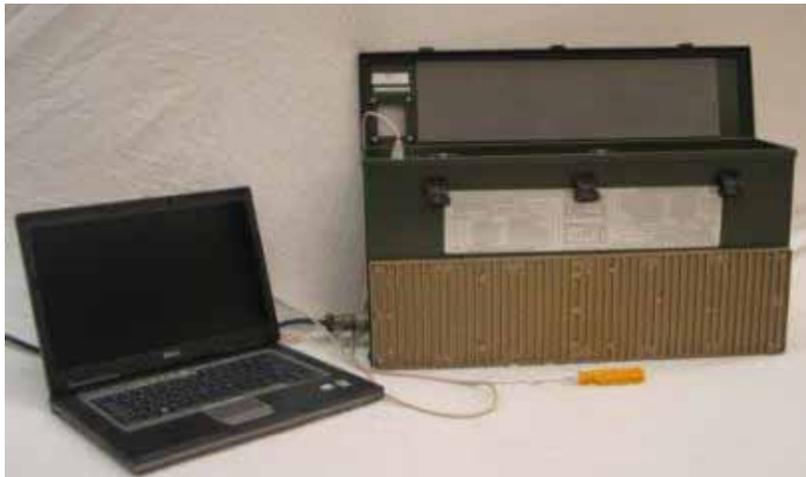
ADAPTER	ADAPTER NSN	FY09 PRICE	U/I	RECHARGEABLE BATTERY	SPC	VMC
J-6358A/P	5940-01-492-6570	N/A	EA	BB-390B/U Only	X	
J-6358B/P	5940-01-501-3312	\$90.40	EA	BB-2590/U BB-390B/U	X	
J-6357A/P	5940-01-493-6388	\$30.83	EA	BB-388A/U BB-2588/U	X	
J-6356/P	5940-01-427-9183	\$30.83	EA	BB-326/U (old BB-516A/U)	X	
J-6355/P	5940-01-427-9247	\$49.27	EA	BB-503A/U	X	
J-6354/P	5940-01-427-9278	\$66.27	EA	BB-2847A/U	X	
J-6523A/P	5940-01-492-7238	\$55.57	EA	BB-557/U BB-2557	X	
J-6521/P	5940-01-467-8813	\$49.27	EA	BB-2600A/U	X	
J-6587/P	5940-01-493-6750	\$50.32	EA	BB-2800/U	X	
J-6589/P	5940-01-493-7622	\$99.37	EA	AA BATTERIES-Any Nickel Metal Hydride AA	X	
J-6588/P	5940-01-493-6751	\$76.43	EA	MBITR BATTERY (PRC-148)	X	
J-6878/P	5940-01-573-9693	\$125.00	EA	FALCON (PRC-152)	X	
J-6879/P	5940-01-573-9679	\$125.00	EA	IISR (PRC-153)	X	
J-6769/U	5940-01-526-8017	\$176.00	EA	CSEL BB-2001A/U	X	
J-6581/U	5940-01-494-7116	\$272.46	EA	BB-2590/U BB-390B/U		X
J-6584/U	5940-01-494-7120	\$300.08	EA	BB-2557B/U BB-557/U BB-2600A/U		X
J-6583/U	5940-01-494-7118	\$342.26	EA	CSEL BB-2800/U BB-390/2590 BB-2847A/U		X
J-6586/U	5940-01-494-4134	\$342.26	EA	MBITR (PRC-148) BB-2800/U BB-390/2590 BB-2847A/U		X
J-6585/U	5940-01-494-3002	\$342.26	EA	FALCON (PRC-152) BB-2800/U BB-390/2590 BB-2847A/U		X
J-6520A/U	5940-01-493-8744	\$303.45	EA	BB-2590/U BB-390B/U BB-388A/U BB-326 BB-2800/U BB-516A/U BB-2847A/U MBITR (PRC-148)		X

## SPC/VMC SOFTWARE UPGRADES

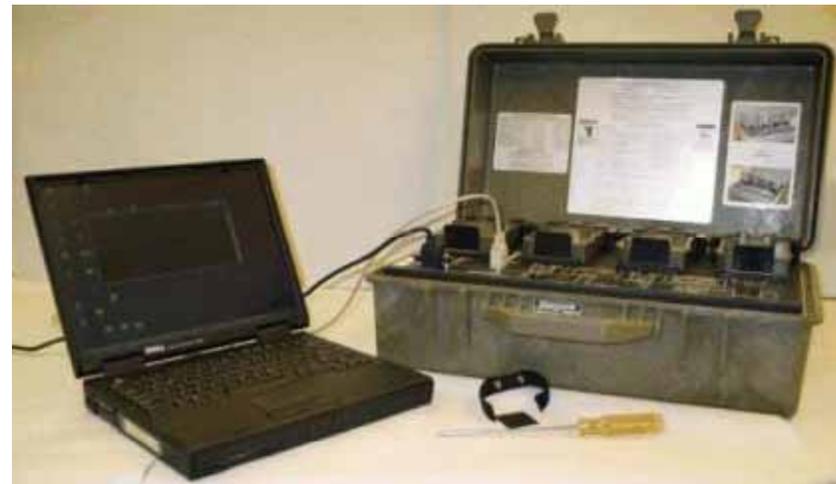
The current version of software for the SPC is SPC 3\_30\_.00 program F.

The current version of software for the VMC is VMC 4.04.01 program A.

As new SPC/VMC adapters are developed supporting software updates will be published. Software updates can be downloaded from the U.S. Army rechargeable battery web site (page 4) or call your supporting FSR (page 3).



**VMC**



**SPC**

## BATTERY SUPPORT ANCILLARY DEVICES



J-6362A/U DC slave cable (5940-01-501-6714) for the PP-8498A/U (SPC).

Disregard the smaller cable (attached), it is only used with the legacy PP-8444A/U.



CX-13560/G NATO Y-cable (5995-01-505-7883) connects two SPC's to one DC slave cable (J-6362A/U).

SDD1 PP-8496/U  
BATTERY HEALTH INDICATOR  
NSN 6130-01-494-4133



Discharges BB-390B/U batteries.

Displays BB-390B/U and BB-2590/U battery health status. Lights indicate overall health of a battery (Front-Line, Training Only, or Ready for Disposal).

# RUGGEDIZED POWER SUPPLY A7705

## 18 - 30 VOLT DC PP-8474/G RPS



MODEL/OUTPUT/NSN  
713860-1 24-28 VDC, 0-60 Amp  
NSN 6130-01-452-8403

MODEL/OUTPUT/NSN  
715875-1 18-30 VDC, 0-60 Amp  
NSN 6130-01-475-4999

Note: DSESTS (E1907G)  
cannot be supported by  
NSN 6130-01-452-8403.

### TI 10477-15/1

The PP-8474/G Power Supply (24-28 VDC and 18-30 VDC) were fielded with a 20 ampere connector on the input power cord. Not all facilities have 20 ampere circuits and receptacles. TI 10477-15/1 describes optional conditions that may be used to correctly operate the PP-8474/G that includes using a 15 ampere adapter on the input power cord. The recommended adapter is NSN 5935-01-232-0983 which has a 20 ampere 125 volt female slot end and a 15 ampere 125 volt male blade end. This adapter is a using unit responsible item (UII). Refer to TI 10477-15/1 for vendor information.

# BENCH TOP POWER SUPPLY A7706

## 0-40 VOLT DC PP-8436/P

### XHR 40-25M (black)



Output: 0-40 VDC, 0-25 Amp  
Input: 85-250 VAC, 47-63 Hz  
NSN 6130-21-911-9149

The Power Supply, Benchtop (BPS) PP-8436/P, model XHR 40-25M was previously fielded to Marine Corps Units. While the BPS XHR 40-25M continues to meet unit mission requirements, no additional quantities are available for issue. Unit T/E deficiencies identified with back order requisitions are being filled by PP-8436/P model XHR 40-25 CE.

### XHR 40-25 CE (white)



Output: 0-40 VDC, 0-25 Amp  
Input: 85-250 VAC, 47-63 Hz  
NSN 6130-01-531-9927

The Power Supply, Benchtop (BPS) PP-8436/P, model XHR 40-25 CE replaces model XHR 40-25M. However, current funding levels are not sufficient to replace all BPS model XHR 40-25M (6130-21-911-6149) power supplies. The available quantities of BPS XHR 40-25 CE (6130-01-531-9927) are only being issued to fill backorders for 6130-21-911-9149.

## 12V RADIO POWER ADAPTERS

**SINGGARS SINGLE POWER  
ADAPTER (SSPA) or PAC-216  
H7710 5985-01-465-2867**



Replaces battery box. Energizes one SINGGARS radio using AC input. Built in UPS. Does not operate off DC power.

**HAND HELD RADIO POWER  
ADAPTERS (SEE PAGE 35)**



**MULTI-SINGGARS POWER ADAPTER  
(MSPA) or ASAPS-6 H7715  
6130-01-458-4041**



Energizes up to six SINGGARS radios using AC or DC power.

**MULTI-RADIO POWER ADAPTER  
(MRPA) H7705 6130-01-473-0349**



Energizes up to six 12V radios using AC or DC power. Supplied with six 12-foot radio power cables.

The MSPA & MRPA are more effective when connected to both AC & 12V VEH DC. While operating from the AC source, the VEH battery acts as an UPS. The AC power also maintains the VEH battery SOC.

## 24V RADIO POWER ADAPTERS

**POWER ADAPTER,  
24V MRC-93 H7706  
6130-01-520-8178**



Replaces battery box.  
Energizes one 24V radio using AC or  
DC input. The MRC-93 is UPS capable  
when any BA-5590 equivalent battery  
is inserted into the adapter. Will not  
charge batteries in this configuration.  
Warranted for 4-years.

**NEXT GENERATION  
24 VOLT RPA TOWER**

**ENERGIZES BOTH 12V  
AND 24 V RADIOS**

**FIELDING FY10**



## **HAND HELD RADIO POWER ADAPTERS**

### **Currently under evaluation – fielding 4<sup>th</sup> QTR FY09**

The Family of Hand Held Radio Power Adapters (HH-RPA) was an initiative under the Marine Enhancement Program (MEP) which resulted in the selection of three HH-RPA's (the IISR HH-RPA, the FALCON HH-RPA, and the MBITR HH-RPA). The HH-RPA is an alternative power item that allows the radio to be operated directly from a BA-5590, BA-5390, BB-390 or BB-2590 battery. The Family of HH-RPA's are currently undergoing Field User Evaluations (FUEs). Following the FUEs, each HH-RPA will be assigned an NSN for units to order as "as required" items.

**AN/PRC-148 / AN/PRC-152 / AN/PRC-153**

**For additional information contact  
pm\_eps@mnci.usmc.mil**

# HAND HELD RADIO POWER ADAPTERS



**HH-RPA-153**



**HH-RPA-152**



**HH-RPA-148**



# QP-1800 DC TO AC INVERTERS

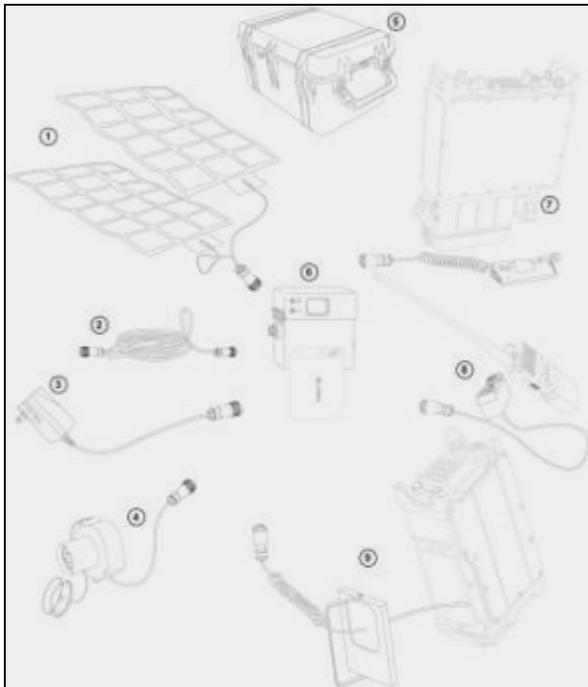
**H0004 6130-01-552-6350**

The QP-1800 Inverter is a semi-ruggedized 1800W DC-to-AC (True Sine Wave) inverter that enables operation of 115 VAC powered devices from a military vehicle 24 VDC power system.



The QP-1800 will continue to deliver power as long as the vehicle battery is within the required input voltage range. High and low battery shutdown will engage if DC voltages fall below 20 VDC or exceed 32 VDC.

## SOLAR PORTABLE ALTERNATIVE COMMUNICATION EQUIPMENT SYSTEM (SPACES) & MULTIPURPOSE SOLAR DEVICE (MSD)



### Notional Multipurpose Solar Device (MSD) Kit

- 1) Solar Panel(s)
- 2) Power Cord
- 3) AC Adapter Cord
- 4) NATO Adapter Cord
- 5) 12V DC Car Adapter
- 6) Zinc Air Battery Adapter
- 7) Waterproof Case
- 8) Power Manager
  
- 12) Two-wire Output Cable



### Currently undergoing User Evaluation

The SPACES MSD collects energy from various sources (solar, DC/AC, Vehicle) to recharge BB-2590 batteries and to power external devices (12V radios).

# **BATTERY STORAGE & OPERATING TEMPERATURES**

**Storage temperatures:** Store batteries as cool as possible but not above 122 degrees F. High storage temperatures will ruin a battery. Most Military batteries have a thermal switch that will trip if exposed to temperatures greater than 190 Degrees Fahrenheit. This thermal “safety” switch is Not resettable, thus the batteries will be DEAD!

Commercial batteries like AAs, Cs, Ds, ect..can be cooked by the heat, so keep ALL batteries as cool as possible!

Rechargeable Batteries left in temperatures below -4 degrees F must be thawed before charging or they may vent. Allow batteries to thaw for at least six hours.

Storing rechargeable batteries for extended periods will cause permanent capacity loss. Even faster loss in HOT environments . . . so . . . charge them at least every six months or better yet . . . USE THEM!

**Operating:** Rechargeable batteries are designed to operate and accept a charge from -4 degrees F to +122 degrees F (-20 degrees C to +50 degrees C). At low temperatures, they may operate, but will not accept a charge cycle. For missions at extreme temperatures, non-rechargeable batteries are your best choice!

**RECHARGEABLES: USE THEM OR LOSE THEM**

# BB-2590 & BB-390 BATTERY MANAGEMENT TIPS

**PURGE** - battery stocks (dispose of BB-590 and BB-390A/U batteries and any physically damaged batteries).

Replenish battery stocks – do not maintain batteries over four years old.

## CHARGE – on PP-8498/U or PP-8481B/U

BB-390B/U – Quarterly; BB-2590/U – Twice a year

- Note the Charger LED status for each battery location prior to battery removal, and proceed as following:

<u>Charger LED</u>	<u>SOCI*</u>	<u>390B</u>	<u>2590</u>	<u>Battery Disposition</u>
Green	Full	X	X	Good to Go, stow in area designated for charged batteries
Green	Not Full	X		Discharge**, recharge, and recheck up to 2 cycles
Green	Not Full		X	SOCI indicates permanent capacity loss, See SDD1 Pg. 29
Red	Full	X	X	Discharge**, recharge, and recheck. If still Red dispose.
Red	Not Full	X	X	Switch location on charger, if still Red dispose.
Flashing Amber	Any	X	X	Switch location on charger, if still Flashing Amber dispose.

\*SOCI is State Of Charge Indicator.

\*\*Use PP-8497/U Discharge Cap See page 24.

**Hint:** Batteries showing almost full SOCI can be processed much faster, consider segregating them.

# POWER OPTIMIZER BATTERY PLANNING TOOL



## POWER Version 1.3

POWER OPTIMIZER FOR THE WARFIGHTER'S ENERGY REQUIREMENTS  
"Battery Calculator"

A screenshot of the POWER OPTIMIZER software interface. The title bar reads 'POWER OPTIMIZER FOR THE WARFIGHTER'S ENERGY REQUIREMENTS'. The interface is divided into several sections: 1. 'What Areas require user input?' with dropdown menus for 'Select an Area', 'Unit List', and 'POG'. 2. 'The selected item is the AN/APSC-117F, Radio Set (DBSC04890)...' with a table of 'Model (part no.)', 'Qty', 'Start Time', 'Units', 'Total', 'Total Start Weight', and 'Weight'. 3. 'Select the temperature conditions to which the problem will be solved' with a dropdown menu. 4. 'Select the device options, select battery to your unit to use' with a table of 'BATTERY', 'Type', 'Part No.', 'Description', and 'Search Information'. 5. 'Check which condition you wish to use' with a dropdown menu. 6. 'The BATTERY is calculated to last 45.6 hrs in the AN/APSC-117F, Radio Set (DBSC04890)...' with input fields for 'hrs of use' and 'You are using 51% of the battery's total available capacity'. 7. 'Enter the number of AN/APSC-117F to be powered' with an input field. 8. 'Enter the number of hours per day the load will be operated' with an input field. 9. 'Enter the number of days the load will be operated' with an input field. 10. 'Enter Data Sheet Link' and 'Enter Report Link' buttons. 11. A table at the bottom showing 'Batteries' with columns for 'Battery Model', 'Max. Cap.', 'Min. Cap.', and 'Density'. 12. A table at the bottom showing 'Batteries Requirements' with columns for '# of Batteries', 'Total Weight (lbs)', and 'Total Capacity (Ah)'.

Model (part no.)	Qty	Start Time	Units	Total	Total Start Weight	Weight
AN/APSC-117F	1	00:00	1	1	1.0	1.0
AN/APSC-117F	1	01:00	1	1	1.0	1.0
AN/APSC-117F	1	02:00	1	1	1.0	1.0
AN/APSC-117F	1	03:00	1	1	1.0	1.0
AN/APSC-117F	1	04:00	1	1	1.0	1.0

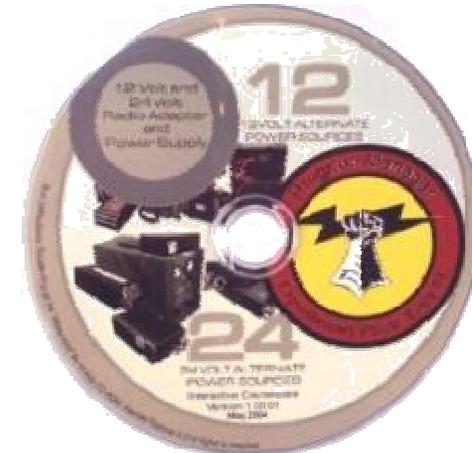
Batteries	Battery Model	Max. Cap.	Min. Cap.	Density
1 Day	AN/APSC-117F	1.0	1.0	1.0
2 Day	AN/APSC-117F	2.0	2.0	2.0
3 Day	AN/APSC-117F	3.0	3.0	3.0

The **POWER OPTIMIZER** is an MS Excel based BATTERY CALCULATOR developed by the U.S. Army to estimate communications equipment battery requirements. It is available from your FSR or by contacting [pm\\_eps@nmci.usmc.mil](mailto:pm_eps@nmci.usmc.mil).

# TRAINING AIDS



**Battery Maintenance and Sustainment Systems** (CD is available from FSRs)

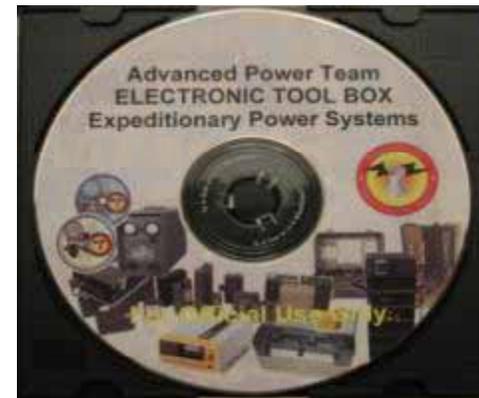


**12 Volt and 24 Volt Radio Adapter and Power Supply** (CD is available from FSRs)

**SPC/VMC Battery Charger Tutorial** is available on the U.S. Army Rechargeable Battery web site (see page 4)



**Advanced Power Team Electronic Tool Box** (CD is available from FSRs)



# POWER MANAGEMENT ON-LINE COURSE

Available at [www.marinenet.usmc.mil](http://www.marinenet.usmc.mil)

Power Management:  
Communication Equipment Operators

Menu Resources Help Audio Replay Show Text Back Next Exit

**Topic Title**  
Charging Procedures

While these battery charging procedures can be followed with any type of rechargeable battery, we will focus on one of the most widely used batteries, the 88-390. To learn the procedures, click each step in the bulleted text.

Battery Charging Procedures:

- Step 1: Purge your stocks
- Step 2: Perform quick checks
- Step 3: Condition batteries
- Step 4: Record charge/recharge cycle
- Step 5: Properly transport and store
- Step 6: Conduct PM
- Step 7: Perform corrective Maintenance
- Step 8: Manage rechargeable stocks
- Step 9: Conduct dual battery swaps

**COURSE 0612AO**

Click the NEXT button to continue.

**Power Management for Communication Equipment Operators.**

Power Management:  
Communication Electronic Officers and SNCOs

Menu Resources Help Audio Replay Show Text Back Next Exit

Introduction to Power Management Course Screen 2 of 2

**Introduction to Power Management Course**  
Course Overview

The lessons within this course will help you better perform your duties as a communications SNCO or officer. Click each lesson below to receive a brief overview of the material that will be covered.

**COURSE 0613AO**

- Lesson 1: Policies and Organizations
- Lesson 2: Fielding Plans
- Lesson 3: Commentary Off the Shelf APS Equipment
- Lesson 4: Battlefield Logistics
- Lesson 5: Unit Level Power Management Plan

Click the Menu button and select the first lesson to continue.

**Power Management for Communication Officers and SNCO's.**

## **BATTERY TIPS**

**AVOID EXTENDED STORAGE**

**DO NOT STORE IN HOT  
CONNEX BOXES**

**DO NOT LEAVE BATTERIES EXPOSED  
TO DIRECT SUN LIGHT**

**USE RECHARGEABLES –  
OR LOSE THEM**