

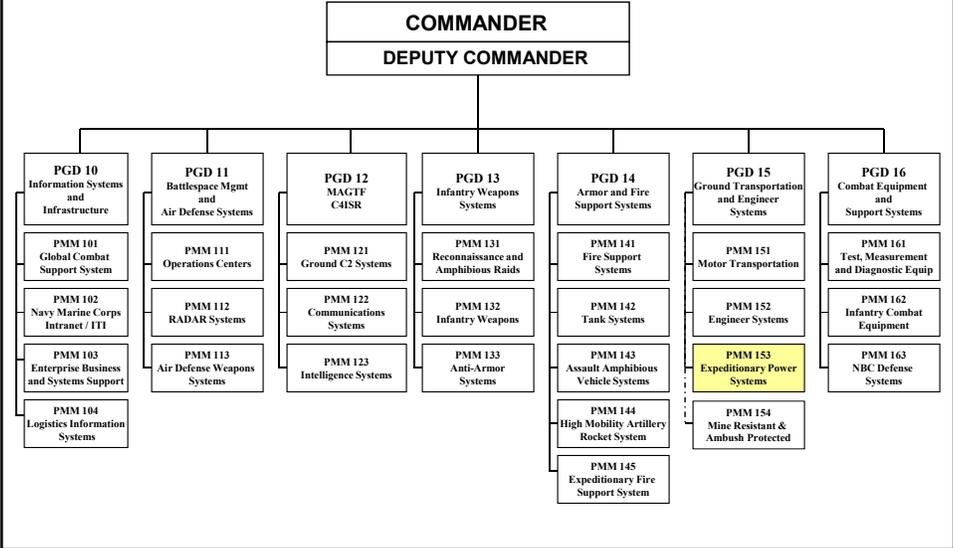
Purpose

To familiarize the student with the family of primary and secondary batteries, battery chargers, power supplies, and alternative power devices used to energize manpacked radio equipment.

To review battery management procedures and battery planning considerations.



Marine Corps Systems Command Product Group Directorates



Expeditionary Power Systems



MISSION STATEMENT

To be the Marine Corps source for development, acquisition, testing, systems integration, product improvement, fielding, and life cycle support of power and environmental control equipment.

POINTS OF CONTACT

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Overview of Discussion Topics

-  Battery Classifications.
-  Primary Batteries used in the Marine Corps.
-  Secondary Batteries used in the Marine Corps.
-  Types of Battery Chargers used in the Marine Corps.
-  Battery Safety.
-  Alternative Power Devices used in the Marine Corps.
-  Battery Management and Planning Considerations.

Why worry about batteries ?



In order to be effective on the battle field, a unit must be able to Move, Shoot and Communicate. As you will see on the following slides, **shortages** of BA-5590/U batteries **almost delayed combat** operations during the invasion of Iraq (OIF-1).

Why focus on the BA-5590/U

NON-RECHARGEABLE LITHIUM SULFUR DIOXIDE BATTERY

- Developed specifically for military use.
- Provides portable power for approximately 60 critical military weapon systems.
- **The most widely used communications equipment battery in the supply system.**



**COMMUNICATIONS
EQUIPMENT**

**TARGETING
SYSTEMS**

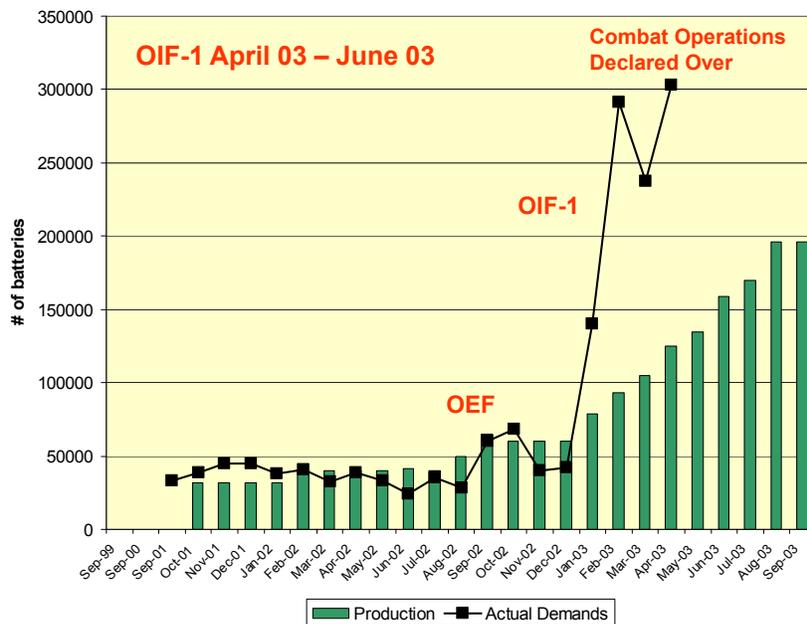
**NBC ALARMS
AND SENSORS**

OIF BA-5590 Monthly Demands and Backorders

| | Peacetime Average | Combat Ops |
|---------------------|--|---------------|
| Pre-Sept 01 | 20,000 | |
| OEF Oct 02 | | 38,380 |
| Jan 03 Gulf Buildup | | 140,000 |
| Jan 03 Back-orders | | 250,000 |
| May 03 Combat Ops* | What if combat operations had continued? | 330,000 |
| May 03 Back-orders | | 900,000 |

* Major Combat Operations declared over

OIF-1 BA-5590/U MONTHLY Battery Demands



U.S. Troops encounter severe shortages of BA-5590 batteries during OIF-1

- Army and Marine Corps units faced critically low supplies of BA-5590s during the spring of 2003.
- **Marine Corps units reported a 2 - 3 day supply rather than a 30 day supply.**
- **Degraded communication capabilities were projected by the end of May 2003.**
- Joint Chiefs issue directive – all BA-5590s go to CENTCOM's AOA.
- **BA-5590/U placed on CMC "Critical Few List".**
- Coalition Forces appoint item manager to apportion batteries to combat units that needed them the most.

EXTRACTS FROM THE GAO REPORT TO CONGRESS APRIL 2005
which investigated five supply shortages that occurred during OIF-I.

What caused BA-5590/U shortages during OIF-1?

- Lack of full-funding contributing to inadequate war reserves.
- Inaccurate forecast requirements.
- Delays due to industrial-base limitations.

**WHAT DOES THIS MEAN FOR THE
WARFIGHTER?**

It means that there is no guarantee that you will not experience BA-5590 battery shortages in the future.



In fact, it is very likely that you will!

Infantry Battalion BA-5590 Battery Requirements

| | <u>PRE-OIF</u> | <u>TCM AAO</u> |
|-------------|----------------------------|-----------------------------|
| AN/PRC-104 | 6 | 0 |
| AN/PRC-150 | 0 | 27 |
| AN/PRC-119F | 72 | 36 |
| AN/PSC-5 | 0 | 0 |
| AN/PRC-117F | 0 | 51 |
| | BA-5590 84 per 24 hours | BA-5590 182 per 24 hours |

TACTICAL
COMMUNICATIONS
MODERNIZATION (TCM)
AND IMPACT ON
BATTERY REQUIREMENTS

EVERY MARINE A RIFLEMAN



EVERY MARINE A RADIO OPERATOR



Operations in Afghanistan, August 2008

Purpose & Strategy of TCM

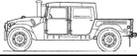
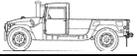
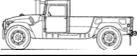
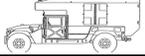
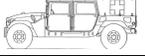
- Equip all tactical vehicles with radios
 - Primarily for voice communications
- Replace end-of-lifecycle systems
 - AN/PSC-5, AN/PRC-104, AN/PRC-113
- Planned force increase (202K) 
- Significant increase at the small unit level
 - Tactical Handheld Radios & Integrated Intra Squad Radios
 - Enhanced Company Operations (ECO) + PRC-117/150

Battery Requirements will increase over the next four years

- Over \$2 billion being invested in “radio systems” across a 4-year period (FY08 – FY12).
- Infantry Battalion Tactical Radio T/E increased from 123 tactical radios to 1,126 tactical radios.
- Radio inventory shifting from 12V systems to 24V systems.

THHR Vehicle Adaptor

TCM Methodology

| D-TAMCN | Vehicle Type | Radio Type/Configuration | |
|-----------|---|------------------------------|---|
| D00307K |  | Dual Vehicle Adaptor (DVA) |  |
| D00327K |  | Dual Vehicle Adaptor (DVA) | |
| D00347K |  | Dual Vehicle Adaptor (DVA) | |
| D00227K |  | Single Vehicle Adaptor (SVA) |  |
| D00337K |  | Single Vehicle Adaptor (SVA) | |
| D10017K |  | Dual Vehicle Adaptor (DVA) |  |
| D10027K |  | Dual Vehicle Adaptor (DVA) | |
| All Other | MTVR, LVSR, etc. | Single Vehicle Adaptor (SVA) |  |

DVA / SVA

SVA consists of
 One AN/PRC-152(V)1 radio
 One Vehicle Antenna
 One Vehicle Adapter Unit
 One Adapter Antenna Switch
 One Shock Mount Interface

DVA consists of
 Two AN/PRC-152(V)1 radios
 Two Vehicle Antennas
 Two Vehicle Adapter Units
 Two Adapter Antenna Switches
 One Shock Mount Interface



Pre-OIF Rifle Co Radios

Co HQ (x3/Bn)

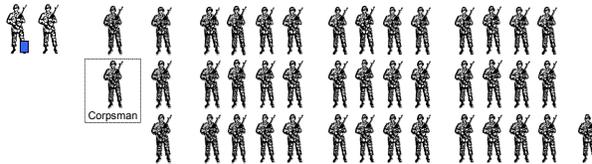


Mounted in M998A1

T/O 6 Officer/176 Enlisted

| | |
|--------------------|---|
| ■ VHF-V (VRC-88): | 1 |
| ■ VHF-M (PRC-119): | 7 |
| ■ UHF-M (PRC-113): | 1 |

RFL Plt (x3/Co x9/Bn)



Radio Weights

PRC-119 - 22.5 lbs
 PRC-113 - 16.7 lbs
 * w/batteries

WPNS Plt (x3/Bn)



MG Sect

Mortar Sect

Assault Sect

TCM Rifle Co Radios

Co HQ (x3/Bn)



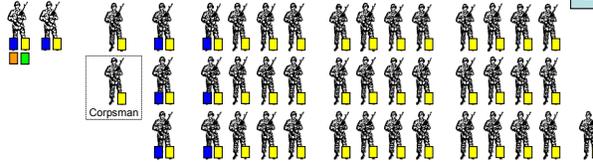
Mounted in M1123A2s

T/O 6 Officer/176 Enlisted

| | | |
|---|---------------------|-----|
| ■ | MBR-V (VRC-103): | 1 |
| ■ | MBR-M (PRC-117): | 6 |
| ■ | HFMR (PRC-150): | 5 |
| ■ | DVA (VRC-110): | 2 |
| ■ | THHR (PRC-148/152): | 35 |
| ■ | IISR (PRC-153): | 176 |

*Corpsman IISR counted in H&S

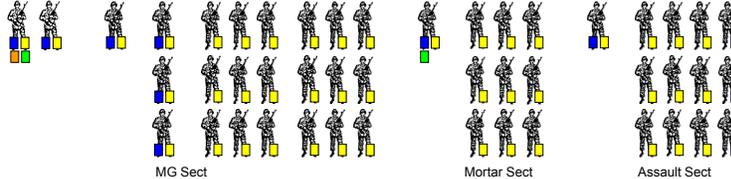
RFL Plt (x3/Co x9/Bn)



Radio Weights

| | |
|---------------|------------|
| PRC-150 | - 15.7 lbs |
| PRC-117 | - 15.9 lbs |
| PRC-152 | - 2.4 lbs |
| PRC-153 | - 1 lbs |
| * w/batteries | |

WPNS Plt (x3/Bn)



MG Sect

Mortar Sect

Assault Sect

So What Can You Do?

You can mitigate the impact that battery shortages would have on your unit by training with and employing alternative power.

The goal of this class is not to make you a battery expert.

The goal is to provide you with the knowledge and resources needed to employ alternative power options to avoid degraded combat capabilities.

A Frequently Asked Question

- What is the current availability status of BA-5590 batteries?
 - There are currently no backorder delays.
 - There were also no backorder delays during 2001 – 2002.

BATTERY CLASSIFICATIONS AND PRIMARY BATTERIES



Battery Classifications: Primary and Secondary

- Primary Batteries (BA) commonly referred to as throwaways.



- Secondary Batteries (BB) commonly referred to as **rechargeable** batteries.



Primary Battery Definition

- Material inside the battery is the prime source of the electrical power it delivers. Capable of one-time use only (**use until depleted and dispose of**).
- The military uses both commercial and MIL SPEC primary batteries.
- The most common types of commercial primary batteries are alkaline D, C, AA, AAA, and 9-volt batteries.



BA-3030



BA-3058



BA-3090



LS 14250



CR-123

Commercial AA Options



BA-3058
 AA ALKALINE
 24 PK
 6135-00-985-7845
 \$5.44 Pack
 Approx. 40 cents ea



L91
 AA LITHIUM
 EA
 6135-01-333-6101
 \$1.81 EA

THE L91 LITHIUM AA BATTERY HAS EIGHT TIMES
 THE ENERGY CAPACITY OF THE BA-3058

FAMILY OF MIL SPEC PRIMARY BATTERIES



BA-5590B/U
 12/24V
 Li-SO₂



BA-5372/U
 6V Li-MnO₂



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



BA-5368/U
 12V Li-MnO₂



BA-5390/U
 12/24V
 Li-MnO₂



BA-5800A
 6V Li-SO₂



BA-5600A/U
 9V Li-SO₂



BA-5374/U
 6V Li-MnO₂



BA-5347/U
 Li-MnO₂



BA-5367/U
 3V Li-MnO₂

FAMILY OF MIL SPEC PRIMARY BATTERIES



BA-5567A/U
3V Li-SO2



BA-5847/U
6V Li-SO2



BA-5598A/U
12V Li-SO2



BA-8140/U
12V Zinc-Air



BA-5557A/U
12/24V Li-SO2



BA-5112A/U
12V Li-SO2



BA-5588A/U
12V Li-SO2

The Family of MIL SPEC Primary Batteries

- For this class we will review the **MOST WIDELY USED** primary batteries for radio communication systems, the BA-5590, BA-5390 and BA-8180.
- Technical characteristics for all 17 battery types can be found in TM-12359A-OD/B.

The Most widely used

The most widely used primary battery in the military is the BA-5590.

The BA-5390 and BA-8180 are acceptable substitutes for the BA-5590.



BA-5590
Lithium Sulfur
Dioxide

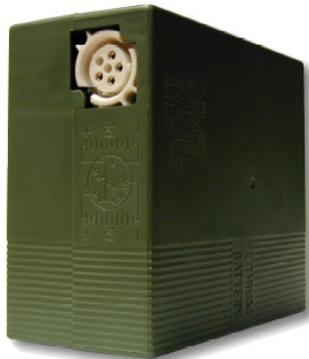


BA-5390
Lithium Manganese
Dioxide



BA-8180
Zinc

Two types of BA-5590s



BA-5590B/U
6135-01-438-9450
PKG (4) \$321.26
\$80.31 per battery



BA-5590A/U **W/SOCI**
6135-01-523-3037
PKG (4) \$366.15
\$91.53 per battery

BA-5590B/U and BA-5590A/U

- **Lithium Sulfur Dioxide**
- MAX VDC 16.0/32.0.
- Contains (2) 12V sections to energize 12V or 24V radio systems.
- Operates in a TEMP range of -20°F to +130°F.
- Shelf life 5 years.
- Complete Discharge Device (CDD) 5-7 Days.
- Thermal switch will trip at TEMP ranges exceeding +190°F.

BA-5390 (Form Fit replacement for the BA-5590)

- **Lithium Manganese Dioxide.**
- Higher cost but provides 40% more runtime than the BA-5590.
- Contains (2) 12V sections to energize 12V or 24V radio systems.
- MAX VDC 16.5/33.0. (Higher than the BA-5590 16.0/32.0)
- Higher MAX VDC can damage some equipment (Javelin).
- Operates in a TEMP range of -20°F to +130°F.
Shelf life is 5 years. CDD device 6-8 Days.
- Thermal switch will trip at TEMP ranges exceeding +190°F.

Two types of BA-5390s



BA-5390/U
6135-01-501-0833
PKG (4) \$488.81
\$122.20 per battery



BA-5390A/U W/SOCI
6135-01-517-6060
PKG (4) \$532.00
\$133.00 per battery

M220 TOW Battery Alert

- Currently an unresolved issue using the BA-5390 W/SOC in the TOW Weapon System.
- No harm to the TOW System.
- No harm to the BA-5390 W/SOC as long as it remains in the TOW battery box.
- **Once the BA-5390 W/SOC is removed from the TOW, an internal fault with the SOC circuit causes the BA-5390 to completely discharge.**

Differences between the BA-5590 and BA-5390



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



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.

Advantages and Disadvantages of Primary Batteries

• ADVANTAGES

- Long lasting.
- Wide temperature range.
- Low self-discharge rate, 5 year shelf time.
- Units do not rely on battery chargers.

• DISADVANTAGES

- Limited production base.
- Disposal is regulated.
- Hazardous if mishandled.
- Cost.
 - One time use.

Zinc-Air Primary Batteries Two types



BA-8180/U
6135-01-500-0572
EA \$389.68
12V or 24V



BA-8140/U
6135-01-517-0952
EA \$262.00
12V Only

Zinc-Air Battery BA-8180/U

- Viable 5590 alternative.
- 12/24V, 800 W/Hr.
- Six pounds.
- 6135-01-500-0572
- \$389.68 EA
- 60 Ah primary power pack.



Contains no hazardous materials

Zinc-Air Battery BA-8140/U

- Viable 5590 alternative.
- 12V, 400 W/Hr.
- Three pounds.
- 6135-01-517-0952
- 30 Ah primary power pack.
- \$262.00 EA



6 -7 days run time for PRC-148



Contains no hazardous materials

Disadvantages of Zinc-Air Batteries

- Requires an interface adapter.
- One time use and must be exposed to air.
- Must be resealed if not completely discharged.
- Will not work when submerged (works fine in rainy conditions).
- Not a form & fit replacement for BA-5590.
- No power level gauge and slight fan noise.

Advantages of Zinc-Air Primary Batteries

- One BA-8180 is equal to 4-7 BA-5590s.
- Very low self-discharge rate.
- Unit does not rely on battery chargers.
- Adapters can be reused.

Advantages of Zinc-Air Primary Batteries

5-7 days for SINCGARS
 4-6 days for SATCOM/HF
 30-40 hours for Tough Book Laptop



| EQUIPMENT | BA-8180/U | ONE BA-8180 | ADAPTER COST | BA-5590B/U COST |
|-----------------------------|-----------|----------------|-----------------|--------------------|
| (1) SATCOM PRC-117/PSC-5 | 5-7 Days | \$389.68 | \$476.00 | \$3,855.12 |
| (1) VHF PRC-119F | 5-10 Days | \$389.68 | \$122.74 | \$2,570.08 |
| (1) VHF SINCGARS (A-E) | 5-9 Days | \$389.68 | \$56.40 | \$2,570.08 |

Zinc-Air Battery Adapters



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



J-6632/U 12 Volt Options



J-6634/U SINCARS A-E



J-6633/U ASIP FOX



**J-6685/U M22
Adapter**



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

Zinc-Air Battery Adapters

| ADAPTER | APPLICATION | NSN | PRICE | 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 |

Zinc-Air Battery Adapters



J-6687/U HAZMAT NOTICE

- Pending USMC MSG release
- Supports the PRC-150 and the PRC-117
- Adapter contains two small sealed lead acid batteries
- **Cannot be disposed of as normal trash – lead acid batteries must be recycled**
- **Adapters are not properly labeled and there may be a shelf life issue**



Contains hazardous materials
– Lead Acid Batteries



Rechargeable Batteries

- Rechargeable batteries are constructed in such a way as to allow for a restoration of the original electrode material by applying voltage from an external source.
- The rechargeable batteries used in the military come in three chemistries: Nickel-Cadmium, Nickel-Metal Hydride, and Lithium-Ion.
- The military uses both commercial and MIL SPEC rechargeable batteries.

Widely used Commercial Rechargeable Batteries

Commercial rechargeable batteries are available in many configurations, AA, D, and C.



A Commonly Asked AA Rechargeable Battery Question

- Is there an approved Lithium-Ion rechargeable AA **1.5 Volt battery**?
- No. There is a AA rechargeable Lithium-Ion battery, made in China, that is commercially available in the US. This battery, while identical to the standard AA in size, has a voltage range of **3.7 Volts**.

It will destroy your equipment.

A Commonly Asked AA Rechargeable Battery Question

- Voltage higher than the standard AA at 3.7 Volts
- No protection circuit
- No low voltage discharge limits

MADE IN CHINA



3.7 Volts

Not approved



1.5 Volts

Approved

Battery Tester MBT-MIL

- 1.2v NiMH / NiCd rechargeable [AA, AAA, C, D]
- 1.5v "76" series button [S76, A76, A625, A640]
- 3v lithium coin [CR2016, CR2025, CR2320, CR2032, 58L, 1/3N]
- 6.5v lithium [BA-5372/U]
- 3v photo lithium [CR123, CR2, CRV3]
- 1.5v alkaline [AA, AAA, C, D, N]
- 6v photo lithium [2CR5, CR223, CR-P2]
- 9v alkaline & carbon zinc

NSN: 6625-01-494-9163 for MBT-MIL
Price \$105.00.



Military Unique Commercial Rechargeable Batteries



BB-MBITR (Li-Ion)
AN/PRC-148
6140-01-487-1153
\$299.31 EA
SPC & VMC
charger



BB-IISR (Li-Ion)
AN/PRC-153
6140-01-548-7367
\$120.00
Commercial or
SPC charger with
software VER F



BB-FALCON (Li-Ion)
AN/PRC-152
6140-01-548-7566
\$270.00
Commercial, MRAP or
VMC charger with
software VER A or SPC
with software VER F

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

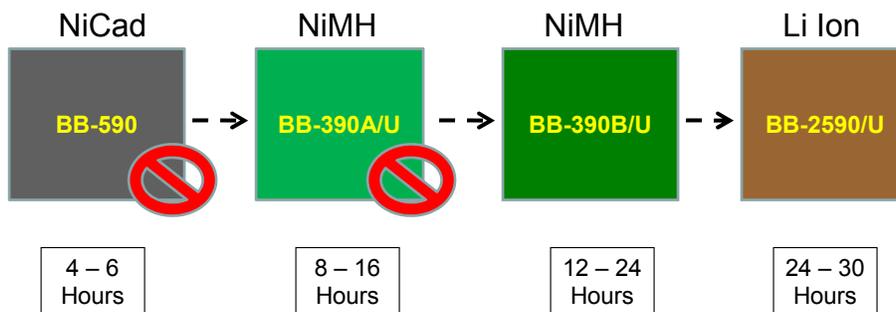


BB-2847A/U
8V Li-Ion

The Family of MIL SPEC Rechargeable Batteries

- For this class we will review the **MOST WIDELY USED** rechargeable batteries for radio communication systems, the BB-390 and BB-2590.
- Technical characteristics for all 12 battery types can be found in TM-12359A-OD/B.

The evolution of Rechargeable Batteries



FORM / FIT REPLACEMENT
FOR 12/24V SYSTEMS

DISPOSE OF ALL BB-590 AND BB-390A/U BATTERIES

The Family of MIL SPEC Rechargeable Batteries

The most widely used (Mil Spec) rechargeable batteries used in the military are the BB-390 and the BB-2590.



BB-390



BB-2590

Two types of BB-390s



BB-390A/U
~~6140-01-419-8187~~
~~U/EA~~ Not Available



BB-390B/U
 6140-01-490-4317
 U/EA \$271.33

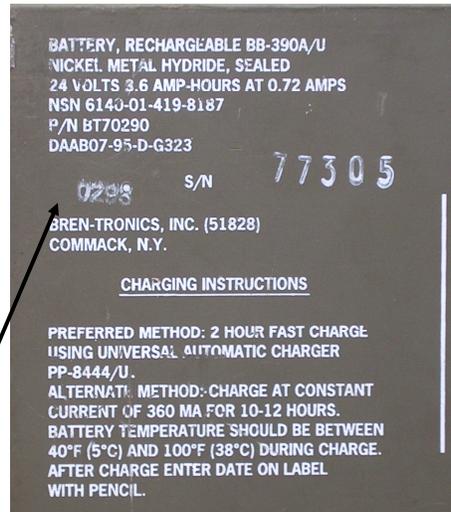
REPLACE BB-390A/U INVENTORIES WITH BB-390B/U OR BB-2590/U

BB-390A/U 6140-01-419-8187

You should have **NO BB-390A/U batteries** in your unit. They may indicate a full charge but battery capacity will not energize a radio for very long.

FEB 1998

0298



BB-390B/U 6140-01-490-4317

- Should be conditioned quarterly.
- Same form & fit as the BB-390A/U.
- Stronger case - better capacity.
- (4) year warranty.
- 12-24 hours vice 8-16 hours of the BB-390A/U.
- Life cycle 3-5 years.



Nickel Metal Hydride

Conditioning Batteries

- Conditioning means performing a procedure to get maximum life from your battery.
- BB-390 batteries require conditioning quarterly.
- Conditioning is done by completely discharging the battery using the PP-8497/U Self-Discharge CAP and then recharging. This process will reset the battery SOC indicator.
- BB-390 batteries should be conditioned quarterly.
- *BB-2590 batteries do not require conditioning.*



PP-8497/U

Why Condition Batteries



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



Solid Black (Old) BB-390



Solid Tan (New) BB-390 or BB-2590

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.

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

- Discharges BB-390B/U batteries.
- Displays BB-390B/U and BB-2590/U battery health status. Lights indicate remaining capacity and overall health of a battery.

- RED Light – poor health, dispose of.
- AMBER Light – fair health, use for training only.
- GREEN Light – good health.



BB-2590B/U

Lithium-Ion

- *Should be charged semi-annually to prevent deep discharge.*
- Desert Tan.
- Weighs one pound less than the BB-390B/U.
- 72% improved run time over the BB-390A/U.
- Can only be charged on the SPC or VMC battery charger.
- **Not approved for Javelin use – the Control Launch Unit (CLU) of the Javelin has upper voltage limits that can be exceeded by the BB-2590/U.**



BB-2590B/U
6140-01-490-4316
U/I EA \$313.13

BB-2590 AND BB-390B/U COMPARISON

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.

Cost Comparison BB-390B/U to BB-2590/U

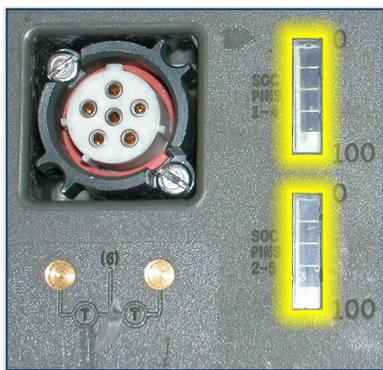
- BB-390 \$271.33 per battery
 - BB-2590 \$313.13 per battery
- \$41.80

WHAT DOES \$41.80 BUY YOU?

- Less time spent on battery maintenance.
- Approximately one less pound of weight.
- 72% improved run time.

BB-2590/U NOT APPROVED FOR JAVELIN USE

SOC Indicators do not show the CAPACITY of the battery!



The SOCI only shows the battery is fully charged, not the battery capacity.

Just because a battery shows a full SOC, it may only have enough energy to run your equipment for a few short hours.

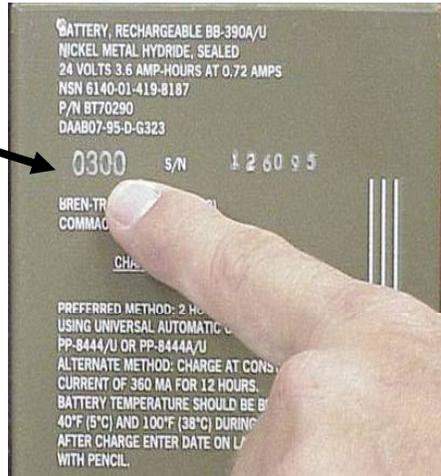
Watch the age of your batteries. Just another good reason to dispose of those aged BB-390A/U batteries.

Rechargeable Battery Warranty

Check the date code –

0300 (left of S/N)
03 – Month (March)
00 – Year (2000)

- BB-390B/U – (4) Years
- BB-2590/U – (4) Years



Advantages and Disadvantages of Rechargeable Batteries

• ADVANTAGES

Cost effective.
- Multiple reuse.

BB-2590 performance equals that of the BA-5590.

Less dependence on the supply system.

• DISADVANTAGES

Unit must rely on battery chargers.

BB-390 batteries must be conditioned quarterly.

Requires more management.

Battery charging is less effective in extreme cold.

BB-390 Rechargeable Battery Advisory

- COMMARCORSYSCOM MSG 271759Z JUN 08
- Advise units of backorder delays when ordering the BB-390B/U.
- 2 – 3 month delays when ordering BB-390B/U.
- No delays when ordering BB-2590/U.

Rechargeable Battery Advisory (PRC-148)

- COMMARCORSYSCOM MSG PENDING
- Inventory of AN/PRC-148 rechargeable batteries.
 - Batteries built by Thales/part # 1600515-7/with 4.8 & Thales in white text are authorized.
 - Batteries built by Thales W/O 4.8 and Thales in white text and built by RACAL should only be used for training or disposed of.

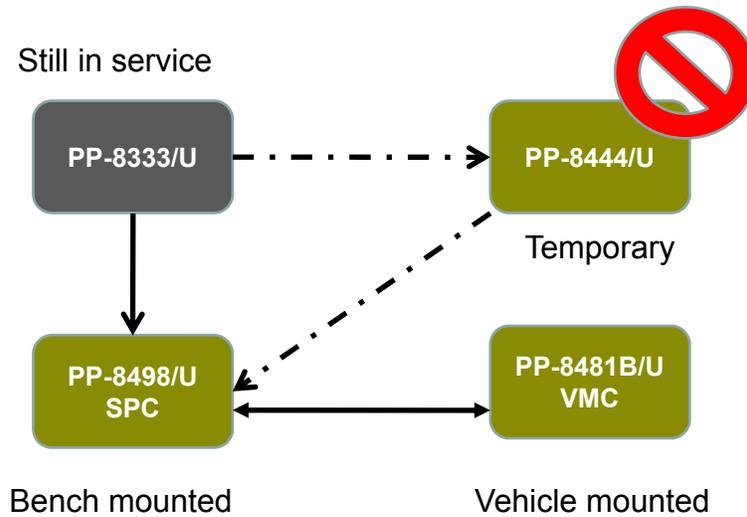
Rechargeable Battery Advisory (PRC-148)

- Batteries built by LYNTRONICS or SHAD Industries with PN PRC148LI, W/O the number 4.8 and Thales in white text, should be pulled from service and a PQDR submitted.
- There are no direct safety issues with non Thales batteries but subject batteries will not fully charge and Thales chargers and may impact operation of the AN/PRC-148 MBITR Radio.
- The only authorized NSN for the AN/PRC-148 rechargeable battery is 6140-01-487-1153.

Tactical Battery Chargers



Battery Chargers in the Marine Corps



Universal Battery Charger PP-8444/U

- Never officially fielded.
- Units received credits from battery recall.
- No longer supportable.
- No repair parts available.
- 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.

CHRISTIE or CASP PP-8333/U Battery Charger/Analyzer

- A7700
- 6130-01-341-2073
- Fielded by Marine Corps Systems Command.
- Will not charge the BB-2590/U.
- Requires periodic calibration.
- Requires MI-09591A-25/1B for the BB-390B/U.
- Requires cables to connect to batteries.



Authorization for turn-in of Analyzer/Charger PP-8333

- COMMARCORSYSCOM 111714Z Jun 09
- No requirement – submit WIR.
- Still required – identify batteries being supported to joanne.martin@usmc.mil

CHRISTIE or CASP PP-8333/U Battery Charger/Analyzer

- The PP-8333 is still required to support the BB-287 for the TOW gun.
- The TOW is being replaced by the SABER.
- Current plans are to maintain enough PP-8333's at the depot to support the TOW until phased out in FY12.



BB-287

Soldier/Suitcase Portable Charger (SPC) PP-8498/U

- A0012
- 6130-01-495-2839
- Operates from AC or vehicle DC voltage.
- Software upgradeable (current is Program F).
- Requires adapters to connect to batteries.
- Has low voltage vehicle cutoff.
- Will charge the BB-2590/U and BB-390B/U.

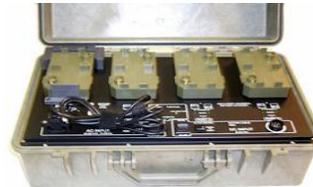


SPC Fielding

| COMMAND | T/E | FY06/07 | FY08 | FY09 | FY10 |
|---------------------------|-------------|---------|------|------|------|
| I MEF | 509 | 48 | 0 | 289 | 260 |
| II MEF | 486 | 44 | 442 | 0 | 0 |
| III MEF | 264 | 36 | 228 | 0 | 0 |
| MARFORRES | 540 | 291 | 147 | 0 | 102 |
| SUPPORTING ESTABLISHMENTS | 183 | 58 | 125 | 0 | 0 |
| MARCENT | 222 | 0 | 222 | 0 | 0 |
| MARSOC | 92 | 92 | 50 | 42 | 0 |
| TOTAL | 2296 | 527 | 1214 | 331 | 362 |

SPC Adapters

- The SPC comes with four BB-390/BB-2590 adapters J-6358B/P.



- Additional adapters can be ordered by the using unit to expand rechargeable battery capabilities.
- Additional adapters support the BB-388A/U, BB-326/U, BB-503A/U, BB-2847A/U, BB-557/U, BB-2600A/U, BB-2800/U, AA Batteries, MBITR Battery and CSEL Battery.

New SPC Adapters



J-6878/P supports the
AN/PRC-152 FALCON
5940-01-573-9693



J-6879/P supports the
AN/PRC-153 IISR
5940-01-573-9679

Both adapters are for the SPC battery charger. SPC requires Program F upgrade. Pending NSN assignment both adapters are available from your FSR or by sending a request to pm_eps@nmci.usmc.mil

SPC Software Configuration Management

- Software configuration is managed by the US Army (CECOM).
- Software updates are posted on the US Army Rechargeable Battery Web Site and distributed by PM EPS FSRs.
- Technical Instruction TI 11099A-OI published June 09 .

Check SPC for Current Software Upgrades

- Check your SPC battery chargers. They should have Program F installed. If not, contact your supporting FSR.



How to locate the computer Com Port

- If you cannot determine the correct com port, follow the below directions.
- CONNECT CABLE FROM THE SPC TO THE COMPUTER
- TURN THE SPC **ON**
- RIGHT CLICK ON "**MY COMPUTER**"
- SELECT "**MANAGE**".
- UNDER "SYSTEM TOOLS" SELECT "**DEVICE MANAGER**"
- A POP-UP WARNING WILL APPEAR, SELECT "**OK**"
- ON THE SCREEN'S RIGHT SIDE EXPAND "**PORTS (COM & LPT)**"
- READ "**PROLIFIC USB-TO-SERIAL BRIDGE**"
- IN PARENTHESIS WILL BE THE PORT IN WHICH YOU WILL
- INITIATE THE DOWNLOAD OF THE SPC CHARGER

SPC Ancillary Devices



J-6362A/U DC slave cable for the PP-8498A/U (SPC). Disregard the smaller cable (attached), it is only used with the legacy PP-8444A/U.



CX-13560/G connects two SPC's to one DC slave cable (J-6362A/U).

Vehicle Mounted Charger (VMC) PP-8481B/U

- H6002
- 6130-01-527-2726
- Mounts in tactical vehicle.
- Operates from AC or vehicle DC voltage.
- Software upgradeable.
- Will charge the BB-2590/U and BB-390B/U.
- **Requires adapters.**
- Has low voltage vehicle cutoff.



VMC Fielding Schedule

| COMMAND | T/E | FY06/07 | FY08 | FY09 |
|---------------------------|-------------|---------|------|------|
| I MEF | 392 | 7 | 0 | 385 |
| II MEF | 370 | 6 | 364 | 0 |
| III MEF | 199 | 8 | 191 | 0 |
| MARFORRES | 404 | 6 | 88 | 310 |
| SUPPORTING ESTABLISHMENTS | 26 | 0 | 26 | 0 |
| MARCENT | 210 | 0 | 210 | 0 |
| MARSOC | 127 | 4 | 123 | 0 |
| TOTAL | 1728 | 31 | 1002 | 695 |

VMC Adapters

- The VMC comes with two universal adapters, J-6520A/U that supports the BB390/2590, BB-516A, BB-326, BB-388, BB-2847, MBITR and the BB-2800.
- Additional adapters can be ordered by the using unit to expand rechargeable battery capabilities.
- Additional adapters support the BB-2557B/U, BB-557/U, BB-2600A/U, CSEL battery, MBITR (PRC-148) battery and the FALCON (PRC-152) battery.

VMC Software Configuration Management

- Software configuration is managed by the US Army (CECOM).
- Software updates are posted on the US Army Rechargeable Battery Web Site and distributed by PM EPS FSRs.
- Technical Instruction TI 11100B-OI published June 09 .

Check VMC for Current Software Upgrades

- Check your VMC battery chargers. They should have Program A installed. If not, contact your supporting FSR.



VMC Draft MI 11100B-OI/1



Mounting in the M1152 2-door Troop Carrier
Cable hard wired to battery terminals

SPC/VMC CHARGER ADAPTER REF TABLE

| ADAPTER | ADAPTER NSN | FY08 PRICE | U/I | RECHARGEABLE BATTERY | SPC | VMC |
|-----------|------------------|------------|-----|--|-----|-----|
| J-6358A/P | 5940-01-492-6570 | \$87.43 | EA | BB-390B/U | X | |
| J-6358B/P | 5940-01-501-3312 | \$88.86 | EA | BB-2590/U BB-390B/U | X | |
| J-6357A/P | 5940-01-493-6388 | \$29.94 | EA | BB-388A/U | X | |
| J-6356/P | 5940-01-427-9183 | \$29.94 | EA | BB-326/U (old BB-516A/U) | X | |
| J-6355/P | 5940-01-427-9247 | \$47.84 | EA | BB-503A/U | X | |
| J-6354/P | 5940-01-427-9278 | \$64.36 | EA | BB-2847A/U | X | |
| J-6523A/P | 5940-01-492-7238 | \$49.22 | EA | BB-557/U BB-2557 | X | |
| J-6521/P | 5940-01-467-8813 | \$47.84 | EA | BB-2600A/U | X | |
| J-6587/P | 5940-01-493-6750 | \$46.47 | EA | BB-2800/U | X | |
| J-6589/P | 5940-01-493-7622 | \$89.81 | EA | AA BATTERIES (any Nickel Metal Hydride) | X | |
| J-6588/P | 5940-01-493-6751 | \$74.30 | EA | MBITR BATTERY (PRC-148) | X | |
| TBD | BTA-70715 | | EA | PRC-152 FALCON BATTERY | X | |
| TBD | BTA-70775 | | EA | PRC-153 IISR BATTERY | X | |
| J-6581/U | 5940-01-494-7116 | \$295.26 | EA | BB-2590/U BB-390B/U | | X |
| J-6584/U | 5940-01-494-7120 | \$312.31 | EA | BB-2557B/U BB-557/U BB-2600A/U | | X |
| J-6583/U | 5940-01-494-7118 | \$332.36 | EA | CSEL BB-2800/U BB-390/2590 BB-2847A/U | | X |
| J-6586/U | 5940-01-494-4134 | \$332.36 | EA | MBITR BB-2800/U BB-390/2590 BB-2847A/U | | X |
| J-6585/U | 5940-01-494-3002 | \$332.36 | EA | FALCON BB-2800/U BB-390/2590 BB-2847A/U | | X |
| J-6520A/U | 5940-01-493-8744 | \$352.93 | EA | BB-2590/U BB-390B/U BB-388A/U BB-326 BB-2800/U BB-516A/U BB-2847A/U MBITR | | X |

Commercial Battery Chargers



MCDOWELL/ULTRALIFE



MOTOROLA



THALES



HARRIS

MRC-85 / MRC-86 Chargers Commercial-Off-The-Shelf

- MRC-85



- MRC-86



MIGHT NOT CHARGE THE BB-2590/U

MRC-85 / MRC-86 Chargers

Commercial-Off-The-Shelf

- MRC-85
- Serial numbers below 1900 WILL NOT charge the BB-2590/U.
- Serial numbers 1900-2199 need to be checked for charging board circuitry Revision C.
- Serial numbers 2200 and above have Revision C.
- Rev C Kit number MRC-7020-1

- MRC-86
- Serial numbers below 1300 WILL NOT charge the BB-2590/U.
- Serial numbers 1300-1499 need to be checked for charging board circuitry Revision C.
- Serial numbers 1500 and above have Revision C.
- Rev C kit number MRC-7020-2

Commercial Battery Chargers

AN/PRC-148 MBITR

6-slot AC/DC Li-Ion Battery Charger
6130-01-504-3675
Charges six batteries within 3 hours



Tactical charger, 12 to 32V DC
Charges two batteries with or without
radios attached, mounts to vehicle



Commercial Battery Chargers

AN/PRC-153 IISR

Four charging bays

Two in front

Two on back

Operates from AC only



Commercial Battery Chargers

AN/PRC-152 FALCON

RF-5853-CH001 | Single-Bay Battery Charger

RF-5853-CH002 | Dual-Bay Battery Charger

RF-5853-CH006 | Six-Bay Battery Charger

These single-, dual- and six-bay battery chargers are compatible with the 12041-2100-02 Lithium-Ion handheld battery and have a typical charging time of six hours. The chargers have integrated battery conditioning and battery recovery capability that can be push-button activated as needed. Front panel indicators identify the battery charge, conditioning, and fault status. The desktop chargers are provided with U.S. and European power cords.



BATTERY SAFETY



CAUTION: Batteries are STORED ENERGY, so is DYNAMITE.

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



Lithium Battery Safety Program

Lithium based batteries, to include Sulfur Dioxide (LiSO₂), 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:

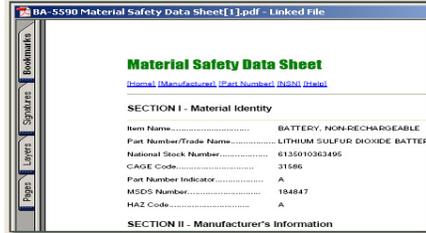
<http://www.marcorsyscom.usmc.mil/sites/pmeps>

Look under [MEP & Battery Policy](#)



Material Safety Data Sheets

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



What you don't know about lithium battery handling could hurt you. So read the material safety data sheet (MSDS) on lithium batteries before you handle them. Where do you get an MSDS? Glad you asked! Log on to the Internet and go to: <http://www.dlis.dla.mil/hmirs/>. Once at the web site, click on: HMIRS Registration Forms.

Lithium Sulfur Dioxide Battery Safety

- Contains toxic gas that smells like sulfur gas.
- Lithium metal is highly reactive, capable of bursting into flames.
- Do not store in a sprinkler protected area.
- Keep class "D" extinguisher on hand.
- Store away from other combustibles.



| | |
|-------------------|------------|
| BA-5112A/U | BA-5557A/U |
| BA-5567A/U | BA-5588A/U |
| BA-5590B/U | BA-5598A/U |
| BA-5600A/U | BA-5800A/U |
| BA-5847/U | |

Lithium Manganese Dioxide Battery Safety

- When abused can ignite into flame.
- Fire burns very hot.
- Electrolyte contains ethers which are highly flammable.



| | |
|-----------|------------------|
| BA-5347/U | BA-5367/U |
| BA-5368/U | BA-5372/U |
| BA-374/U | BA-5390/U |

Bad things do happen!

Fort Monmouth fire damage estimated at more than \$1M

- March 2009
- Fire destroys two laboratories at U.S. Army Communications Command (CECOM)
- Fire began in the Battery Test and Evaluation Lab

WARNING – Replace sets of batteries with like batteries only

- If equipment utilizes more than one battery at a time for primary power, always replace all of the batteries at the same time.
- Use only fresh or fully charged batteries.
- Never mix batteries and never use a non-rechargeable and a rechargeable version of the batteries at the same time.

WARNING – Replace sets of batteries with like batteries only



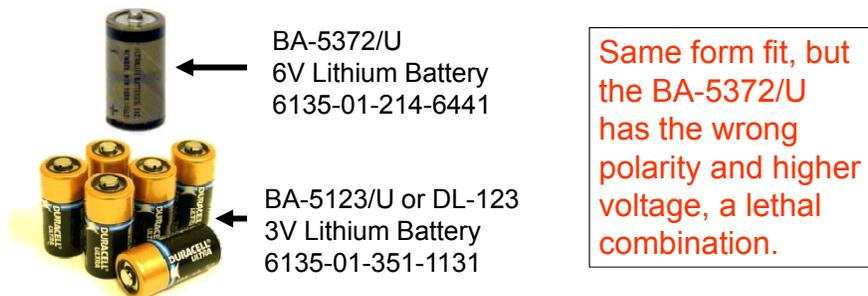
This actually happened to a mechanic working at the Oak Ridge National Laboratory (Reference Safety Flash, Lesson ID 2008-UTB-ORNL-0010; [contact POC below for a copy of the report if you'd like to see the whole story](#)). The mechanic didn't have the advantage of seeing the warning before replacing two different brands of "Lithium 123A" batteries (NSN 6135-01-351-1131) into the flashlight.

BA-5590 Ground Precautionary Message

1. Safety incident resulted in minor personnel injury and severe equipment damage when one of two BA-5590 Lithium Sulfur Dioxide Batteries violently vented. One battery had a very low state of charge (SOC).
2. Standard practice is the replacement of two or more prime power batteries with new/unused batteries from the same manufacturer and same lot. This ensures that batteries are at approximately the same SOC.

AN/CYZ-10 Example

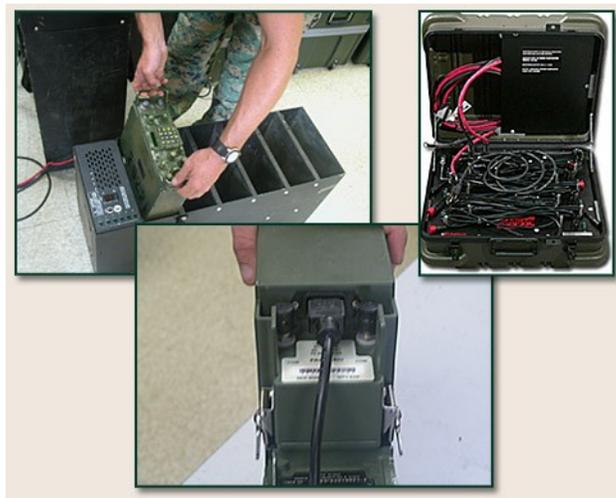
- Incorrect batteries were used in a CYZ-10 incident.
- The CYZ-10 uses three BA-5123/U 3V batteries.
- When three BA-5372/U 6V batteries were installed, the CYZ-10 heated up and was destroyed.



CYZ-10 Keyboard and Battery Compartment



Radio Power Adapters and Power Supplies used in the Marine Corps



SINGGARS Single Power Adapter (SSPA) or AN/PAC-216

- Replaces the battery box.
- Uses AC voltage input only.
- Will not operate from DC voltage.
- Built in UPS.
- Fielding is complete.

12V RPA



TAMCN H7710
NSN 5985-01-465-2867

Multi-SINGGARS Power Adapter (MSPA) or ASAPS-6

- Energizes up to six SINGGARS radios.
- Uses AC or 12V DC power input.
- Fielding is complete.



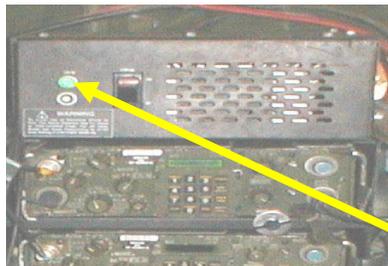
TAMCN H7715
NSN 6130-01-485-4041

12 Volt RPA

Two Multiple SINGARS Power Adapter's in COC configuration



WARNING – Make sure the MSPA you use has individual channel protection switches



Commercial Model

Fielded Model – with individual over voltage protection



Multi-Radio Power Adapter (MRPA) or ASAPS-SC or SNAP 6CC

- Energizes up to six 12V radios.
- Uses AC or DC voltage input.
- Supplied with six 12-foot radio power cables.
- Fielding is complete.

12 Volt RPA



TAMCN H7705
NSN 6130-01-473-0349

24 Volt Radio Power Adapter MRC-93

- Replaces the battery box.
- Energizes one 24V radio.
- Uses AC or DC power input.
- UPS capable when any BB-5590 equivalent battery is inserted into the adapter. **Will not charge batteries.**
- 4-year warranty.
- Fielding is complete.



24V RPA for the
PRC-150, PSC-5,
PRC-117

TAMCN H7706
NSN 6130-01-520-8178

Next Generation 24V RPA Tower

- Tower configuration for COC and Antenna Farms

Fielding FY10



Next Generation 24 Volt RPA



Single station RPA
Double tray
Transit case
Amplified Speaker
UPS or UPS capable

HAND HELD RADIO POWER ADAPTERS Currently under evaluation – fielding 4th 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.

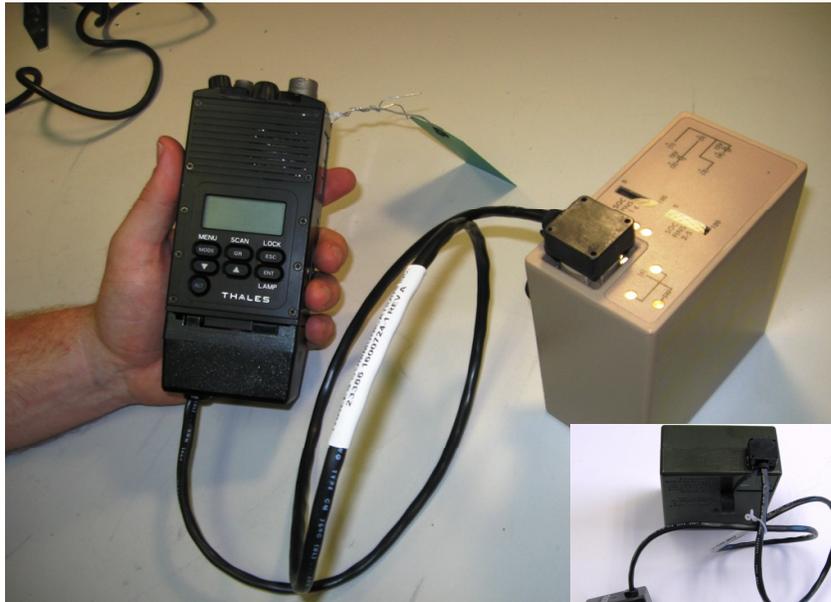
AN/PRC-148 / AN/PRC-152 / AN/PRC-153



HH-RPA-153

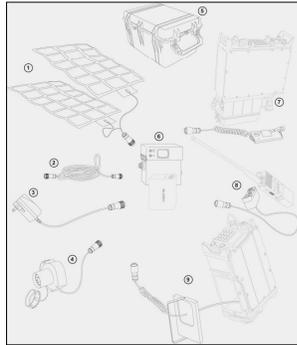


HH-RPA-152



HH-RPA-148

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

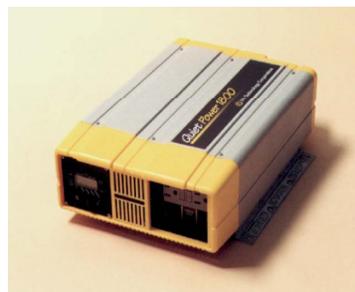


Currently undergoing User Evaluation

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

QP-1800 DC to AC Inverter

- Semi-ruggedized.
- Runs from vehicle 24VDC.
- Connects using supplied NATO slave cable.
- Output is 115VAC True Sine Wave, 1800W.
- Fielding completed 2d Q FY09.



TAMCN H0004
NSN 6130-01-552-6350

Mounting Bracket and Shock Mounts



Mounting bracket
is a free issue
item per
MI 111460-OI/1



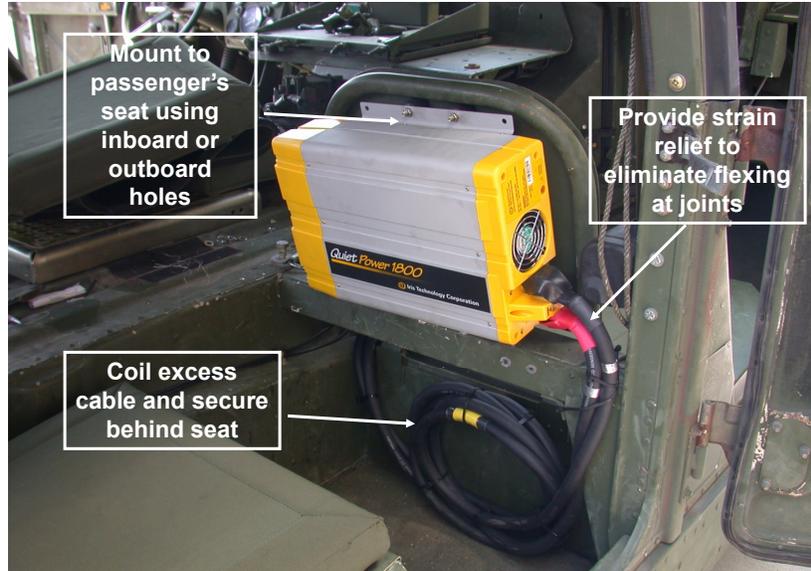
Must use shock
mounts or the
warranty is void

REQUIRED

QP-1800 Inverter



QP-1800 Inverter Installation



Mount to passenger's seat using inboard or outboard holes

Provide strain relief to eliminate flexing at joints

Coil excess cable and secure behind seat

18-30 Volt DC PP-8474/G RPS Ruggedized Power Supply A7705



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

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

TI 10477-15/1

The PP-8474/G Power Supply (24-28 VDC 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. This TI 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. Refer to TI 10477-15/1 for vendor information.



15 AMP adapter Note: When using this adapter, power output is de-rated. Refer to the TI for instructions.

Note: DSESTS (E1907G) can only be supported by NSN 6130-01-475-4999.

BATTERY MANAGEMENT



Why is Battery Management important?

1. Save dollars that can be used for other critical requirements.
2. Become **POWER INDEPENDENT** and not totally reliant on the supply system.
 - In the fog of war many unexpected events can occur that will disrupt or delay re-supply.

ABOUT THAT \$\$\$\$

Throwaways vs. Rechargeables
(based on 504th PIR (82nd) Task Force, JRTC 02-07)

For an 11 Day rotation:



4,840 BA-5590s \$371K

Vs.



1,588 BB-390s \$403K*

To Support 180 Day rotation:



79,200 BA-5590s \$6.1M

*** Zero Increase in Rechargeables**
Saves \$5M+
Eases Surge Rqmt
2/3 of Rechargeable Life Left

Remember – HEAT IS BAD



Where are your batteries?

- Avoid extended storage.
- Do not store in hot connex boxes.
- Do not leave batteries exposed to direct sun light.



Planning Considerations

- Budget for replenishment (upgrade BB-590 and BB-390A/U).
- Expensive cost to Command – coordinate with the S-4 and Supply Officer (Know what your fiscal shortfall requirements are at the end of the FY).
- Hazardous Material.
 - How is it transported?
 - How is it disposed of? ref
- Charge/Recharge every six months –

USE THEM or LOSE THEM!

Cold Weather Concerns

Rechargeable batteries are designed to operate and accept a recharge cycle from -4°F to +122°F (-20°C to +50°C). At low temperatures, they will operate, but will not accept a recharge cycle.

Charging should occur above +40°F. In temperatures below +40°F, the batteries will take much longer to charge and may not charge fully.

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



Publish a POWER MANAGEMENT SOP

- Check higher/local policies & directives.
- Review your units mission profile.
- Determine your primary battery requirements.
- Determine rechargeable battery requirements.
- Identify battery shortages.
- Determine # of battery chargers required.
- Determine alternative power devices required.
- Prioritize requirements / request funding.

POWER MANAGEMENT ON-LINE COURSE

Available at www.marinenet.com

**Power Management:
Communication Equipment Operators**

COURSE 0616AO

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 88-200. To learn the procedures, click each step in the bulleted text.

Battery Charging Procedures:

- [Step 1. Purge your stock](#)
- [Step 2. Perform stock check](#)
- [Step 3. Condition batteries](#)
- [Step 4. Record charge/recharge cycle](#)
- [Step 5. Prepare, transport, and store](#)
- [Step 6. Conduct EM](#)
- [Step 7. Perform end-of-life maintenance](#)
- [Step 8. Manage rechargeable stock](#)
- [Step 9. Conduct dual battery swap](#)

Click the NEXT button to continue.

**Power Management for
Communication
Equipment Operators.**

**Power Management:
Communication Electronic Officers and SNCOs**

COURSE 0613AO

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.

**INSTRUCTIONS ON DEVELOPING A
UNIT POWER MANAGEMENT
SOP**

- Lesson 1
Policies and Organizations
- Lesson 2
Funding Plans
- Lesson 3
Commercial Off the Shelf APO 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 NCOs.**

CALCULATING BATTERY REQUIREMENTS



Calculating Battery Requirements

| BATTERY | Count | on Hand | 15 Day | ↔ | 15 Day | ON Hand | DATE |
|----------------|-------|---------|--------|---|--------|---------|-----------|
| 6V | 132 | 132 | 150 | | 425 | 798 | 27 Jul 04 |
| 9V | 479 | 479 | 500 | | | 46 | BA-5590 |
| AA | 177 | 177 | 3200 | | 700 | 632 | BA-5800 |
| AAA | 4 | 4 | | | 700 | 1 | BA-5847 |
| BB-390 | 51 | 51 | | | | NONE | BA-8760 |
| BB-516 | 222 | 222 | | | 500 | 408 | C |
| BA-590 | 13 | 13 | | | | 587 | CR 1/2N |
| BA-2847 | 4 | 4 | | | | 301 | D |
| BA-3517 | 1 | 1 | | | 2200 | 280 | DL 1/2N |
| BA-5125 (ANCO) | 142 | 142 | 200 | | 2160 | 48 | LS6 (36v) |
| BA-3517 | 1 | 1 | | | 200 | 59 | BA-5347 |
| BA-5372 (Nub) | 138 | 138 | 269 | | | 1 | BA-5598 |
| BA-5567 (Pack) | 1,195 | 1,195 | 1300 | | | | |

Calculating Battery Requirements

| Operation | | | | | Battery | Worksheet | | | | | |
|-----------|---------|----------------|---------------|------|---------|-----------|------|------|------|------|---------|
| #of Days | 5 | | | | | | | | | | |
| Equipment | # Units | # Bat per unit | Days Bat Life | Days | | | | | | | LS 6/AA |
| PRC-119 | 20 | 1 | 1 | 5 | | 100 | | | | | |
| HUB | 20 | 1 | 30 | 5 | | | | 20 | | | |
| RCU | 2 | 1 | 1 | 5 | | 10 | | | | | |
| PRC-104 | 6 | 2 | 1 | 5 | | 60 | | | | | |
| PRC-113 | 2 | 2 | 1 | 5 | | 20 | | | | | |
| PSC-5 | 1 | 2 | 0.5 | 5 | | 20 | | | | | |
| KY-99 | 6 | 1 | 1 | 5 | | 30 | | | | | |
| PSN-11 | 6 | 1 | 1 | 5 | | | | | | 30 | |
| HUB | 6 | 1 | 120 | 5 | | | | | | | 6 |
| CYZ-10 | 2 | 3 | 120 | 5 | | | 6 | | | | |
| AN/GRA-39 | 15 | 12 | 1 | 5 | | 900 | | | | | |
| TA-312 | 20 | 2 | 1 | 5 | | 200 | | | | | |
| TOTALS | | | | 5 | | 1100 | 240 | 6 | 20 | 30 | 6 |
| | | | | | | 3030 | 5590 | 5123 | 5372 | 5800 | LS 6/AA |

The POWER OPTIMIZER



POWER

Version 1.3

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

Created by: US ARMY CE-LCMC, Power Sources Team, Fort Monmouth, NJ

Calculating Battery Requirements

- Excel data base application.
- Easy to use at the unit level.
- Contains current FY price tables and can be updated each FY.
- MUST adjust macro security settings on computer.
- Request from pm_eps@nmci.usmc.mil.

POWER OPTIMIZER FOR THE WARRIOR'S ENERGY REQUIREMENTS
 Created by USA CE-LCMC, Power Source Team, Ft. Monmouth, NJ
 Distribution authorized to U.S. Government agencies and their contractors for official use or for administrative or operational purposes only.

White Areas require user input

1) Select an End Item

Choose Item by:

Item List

| | |
|------------|------------|
| ANPRC-119F | ANPRC-119F |
| ANPRC-119G | ANPRC-119G |
| ANPRC-119H | ANPRC-119H |
| ANPRC-119J | ANPRC-119J |

POC: USA CE-LCMC, Ft. Monmouth, NJ
 Art Herman
 Email: art.herman@ce.lcmc.mil
 Phone: (732) 832-4763 DSN: 992-4763
 Please Reference: Release Candidate 1.1, 1/21/06

The selected item is the ANPRC-119F, Radio Set (SINCGARS), NSN: 5820-01-451-4292

2) Select the temperature conditions in which the end item will be used

| Battery option(s) | Qty | Run Time | Units | Note | Total Batt. Weight | Units |
|-------------------|-----|----------|-------|------|--------------------|-------|
| BA5390 | 1 | 33 | hrs | | 2.3 | lbs |
| BA5390 | 1 | 50 | hrs | | 3.0 | lbs |
| BE2590 | 1 | 31 | hrs | | 2.2 | lbs |
| BE3390 | 1 | 23 | hrs | | 3.9 | lbs |
| BA4190 | 1 | 100 | hrs | | 6.0 | lbs |

3) Given the above options, which battery do you wish to use

| Battery | NSN | # per package | Description | Specific Information |
|------------|---------------|---------------|--|----------------------|
| BA-5390(U) | 6135015170000 | 4 | Battery, Non-Rechargeable, Lithium-Manganese Dioxide, With SOCI | |
| BA-5390(U) | 6135015103833 | 4 | Battery, Non-Rechargeable, Lithium-Manganese Dioxide, Without SOCI | |

4) Choose which version you wish to use

5) The BA5390 is estimated to last 45.5 hrs in the ANPRC-119F, Radio Set (SINCGARS), at Normal Temperature (10F to 122F)
 The battery will be swapped out after... hrs of use
 You are using 97% of the battery's total estimated capacity

6) Input the number of ANPRC-119F to be powered devices

7) Input the number of hours per day the end item will be in operation hrs

Steps 6 and 7 are for rechargeable batteries only.
 For more information on rechargeable batteries and chargers see the tab labeled 'Rechargeable Info'

8) How frequently will the warfighter be recharged with charged batteries? hrs

9) What is the TOTAL number of rechargeable batteries that will be needed to support operations for 24/24 hours?
 (e.g. 800 1 for the device, 1 for backup, 1 on the charger, 1 in transit etc.)

| Battery | Battery NSN | # per package | # of devices | Device |
|------------|-----------------|---------------|--------------|------------|
| BA-5390(U) | 6135-01-5170000 | 4 | 41 | ANPRC-119F |

Minimum Requirements

| | # of Batteries | # Pkg to order | Total Weight (lbs) |
|----------------|----------------|----------------|--------------------|
| 1 day mission | 43 | 10.8 | 129.0 |
| 3 day mission | 86 | 21.6 | 258.0 |
| 30 day mission | 645 | 161.3 | 1,835.0 |

Master Battery Requirements Model

- Battery planning tool.
- Does not contain price tables.
- Run scenarios.
- Good MEF level planning tool.
- Available from your FSR.



NO LONGER CURRENT

COMMERCIAL OFF THE SHELF (COTS)



Commercial-Off-The-Shelf (COTS)



VB-90 Power Adapter for the AN/PRC-119F (ASIP).



SCAVENGER – recharge AAs in 100 minutes scavenging unused energy from BA-5590 equivalent batteries.



AN/PRC-148 (MBITR) Battery Cell Holder, accepts (12) DL123A or BA-5123 batteries and provides ten hours of operation at 5-Watt transmit level.



MRC-41 – holds primary or rechargeable battery, powers the AN/PRC-148.

Products pictured here have not been tested to Military Specifications.

Commercial-Off-The-Shelf (COTS)

- BUYER BEWARE – many vendors will attempt to sell products they claim will meet military specifications.
- They may or may not fail at high or low temperatures or in field environments.
- If they fail, who repairs them?

WARNING: Distributors offer batteries that are similar to the BA/BB government approved batteries. Unless a battery has a BA/BB designation, it is unlikely that they have been safety approved. Direct any questions to pm_eps@nmci.usmc.mil.

Commercial-Off-The-Shelf (COTS)

- PM EPS tests many COTS alternative power devices. These test results are releasable to U.S. Military. Check with PM EPS before you buy.

pm_eps@nmci.usmc.mil

- Playing it smart in the beginning, can save you time, money, and frustration in the end.

REFERENCES AND TRAINING MATERIALS



Web Sites

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"



Training Material Support



Battery Maintenance and Sustainment Systems CD



12 Volt and 24 Volt Radio Adapter and Power Supply CD

Additional copies are available from your supporting FSR or send an e-mail request to pm_eps@nmci.usmc.mil (REMEMBER TO INCLUDE YOUR MAILING ADDRESS).

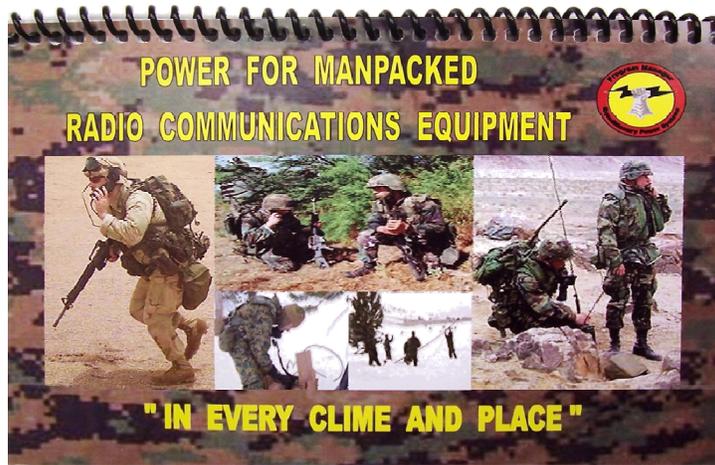
SPC/VMC Battery Charger Tutorial

Available on the U.S. Army Rechargeable Battery web site

www.monmouth.army.mil/cecom/lrc/lrchq/power/rechargebat.html

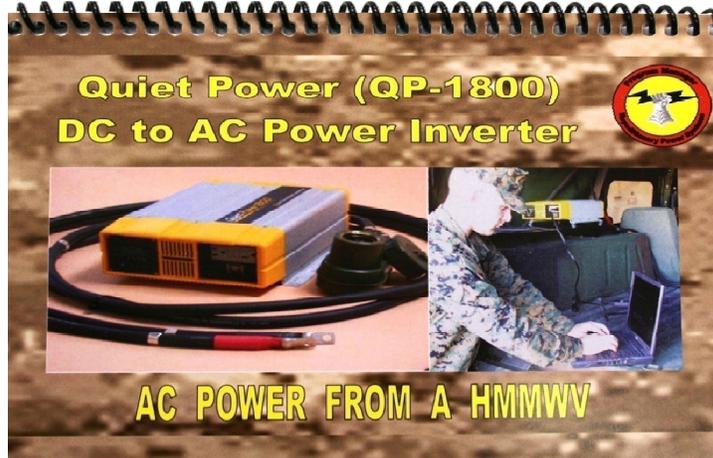


Training Material Support



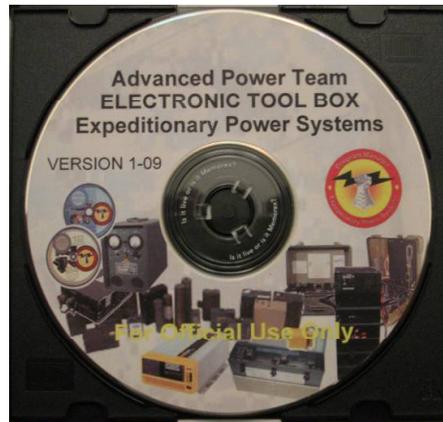
Additional copies are available from your supporting FSR or send an e-mail request to pm_eps@nmci.usmc.mil (REMEMBER TO INCLUDE YOUR MAILING ADDRESS).

Training Material Support



Additional copies are available from your supporting FSR or send an e-mail request to pm_eps@nmci.usmc.mil (REMEMBER TO INCLUDE YOUR MAILING ADDRESS).

Advanced Power Team Electronic Tool Box



CD's are available from your supporting FSR or send an e-mail request to pm_eps@nmci.usmc.mil (REMEMBER TO INCLUDE YOUR MAILING ADDRESS).

Advanced Power Team Electronic Tool Box

CONTAINS FOURTEEN FOLDERS

- Messages
- Newsletters
- Safety materials
- Equip Characteristics
- SPC/VMC Software
- Power Optimizer
- APT Equip SL-3's
- Battery price lists
- Reference materials
- PSC Modifications
- COMM-ELEC Trn
- Relevant briefs from past conferences

Quarterly Newsletter

IN SEARCH OF ALTERNATIVE POWER SOURCE SOLUTIONS

- Eighteen issues published.
- Covers all commodities.
 - Engineers
 - Motor Transport
 - COMM-ELEC
 - Ordnance
 - Provides information on APS and Vehicle Battery maintenance products
 - And more.....



Past Issues of POWER TIDBITS

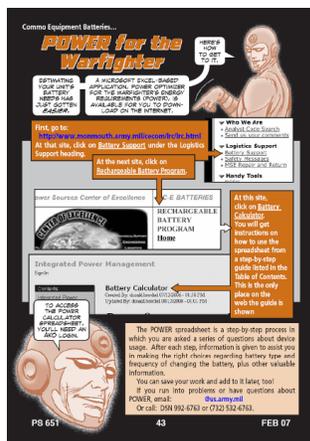
| | | | |
|-----------------|----------|------|--------------------------|
| - VOL 1 ISSUE 1 | 1 OCT | 2002 | INAUGURAL ISSUE |
| - VOL 1 ISSUE 2 | 31 MARCH | 2003 | NEW APS FIELDING |
| - VOL 1 ISSUE 3 | 30 JUNE | 2003 | AUTOMOTIVE ISSUE |
| - VOL 1 ISSUE 4 | 4 JULY | 2003 | U.S. ARMY FEATURE ISSUE |
| - VOL 1 ISSUE 5 | 25 DEC | 2003 | XMAS EDITION |
| - VOL 1 ISSUE 6 | 16 APRIL | 2004 | MARDI GRAS SPECIAL |
| - VOL 1 ISSUE 7 | 30 OCT | 2004 | FALL SPECIAL |
| - VOL 1 ISSUE 8 | 15 DEC | 2004 | XMAS SPECIAL |
| - VOL 2 ISSUE 1 | 31 MARCH | 2005 | ALL ABOUT SAFETY |
| - VOL 2 ISSUE 2 | 15 MAY | 2005 | ARMED FORCES DAY EDITION |
| - VOL 2 ISSUE 3 | 18 OCT | 2005 | FOURTH OF JULY ISSUE |
| - VOL 2 ISSUE 4 | 18 DEC | 2005 | XMAS SPECIAL EDITION |
| - VOL 3 ISSUE 1 | 28 FEB | 2006 | MARDI GRAS EDITION |
| - VOL 3 ISSUE 2 | 30 MAY | 2006 | MEMORIAL DAY EDITION |
| - VOL 3 ISSUE 2 | 29 SEPT | 2006 | SUMMER CLOSEOUT EDITION |
| - VOL 3 ISSUE 4 | 20 FEB | 2007 | MARDI GRAS EDITION |

POWER TIDBITS

- Available on the PM EPS WEB SITE.
- Available on TECHNET.
- If you want to be added to the POWER TIDBITS mailing list:
 - send an e-mail request to:
 - pm_eps@nmci.usmc.mil.

PS Magazine

<https://www.logsa.army.mil/psmag/pshome.cfm>



Read current issue
online

Scan back issues

View PS Hot Topics

**GOOD SOURCE FOR BATTERY AND
BATTERY CHARGER INFORMATION**

Marine Enhancement Program (MEP)



<https://www.mccdc.usmc.mil/featuretopics/mep/>

In Fiscal Year 2009, the MEP Team plans travel to provide presentations and displays at the following locations:

- Modern Day Marine in Quantico, VA
- Marine South in Camp Lejeune, NC
- Commanders Course at MCU in Quantico, VA
- Staff Noncommissioned Officer Academies worldwide

Please stop by our display booth to see some of the latest gear and talk to members of our team.

Summary

- Using rechargeable batteries and alternative power devices is good training for your Marines and will save you thousands of dollars.
- Not using rechargeable batteries and alternative power devices leave you dependent on a supply system you do not control, and may impact your ability to meet mission requirements.

Questions



How do I get started?





Step 1 – Training and Facilities

- Ensure designated personnel (Battery NCO) are properly trained.
 - Hazardous Material Operator Course (MCB)
 - Emergency Spill Response Course (MCB)
 - Marinenet Power Management Course (0612AO)
- Dedicate a battery charging area.
- Keep the area organized.
- Make sure you are in compliance with all OSHA, EPA, local State and Marine Corps regulations.

Step 2 – Separate Primary and Rechargeable Batteries

- Primary Batteries
 - Use only when absolutely necessary
 - Rotate stocks – First In First Out
 - Watch “shelf life” dates
 - For batteries with SOCI – less than 75/80 %, use for training and dispose of.

Step 2 – Separate Primary and Rechargeable Batteries

- Secondary (rechargeable batteries)
 - PURGE battery stocks (dispose of BB-590 and BB-390A/U batteries and any physically damaged batteries)
 - Replenish all battery stocks over four years old
 - Separate remaining BB-390B/U batteries from BB-2590/U batteries

Step 3 – Recharge BB-390B/U Batteries

- Separate BB-390B/U batteries showing almost full SOC from others
 - Batteries showing almost full SOC and be processed much faster
- Charge batteries on PP-8498/U or PP-8481B/U

Condition and charge all BB-390B/U batteries quarterly

Step 3 – Recharge BB-2590/U Batteries

- Separate BB-2590/U batteries showing almost full SOC from others
 - Batteries showing almost full SOC and be processed much faster
- Charge batteries on PP-8498/U or PP-8481B/U

Recharge all BB-2590/U batteries semi-annually to prevent deep discharge

Step 4 – Battery Storage Facts

- Battery chemistry is important to be aware of as some types have incompatible chemistries and should not be stored together
- Do not store batteries with, or in the same stacks with other hazardous materials
- Primary lithium batteries should always be segregated from other types of batteries. If space is limited, contact your installation's fire department

Step 4 – Battery Storage Facts

-Continued-

- Activities are responsible for obtaining approval for battery storage areas from their installation's fire department.
- Lithium batteries have special storage requirements, make sure you review the Material Safety Data Sheet for lithium and all other batteries.

Step 5 – Battery Storage

Remember – **HEAT** IS BAD

- ❖ Storing rechargeable batteries for extended periods will cause permanent capacity loss. **EVEN FASTER IN HOT ENVIRONMENTS.**
- ❖ Most military batteries have a thermal switch that will trip if exposed to temperatures greater than 190 Degrees Fahrenheit. The “thermal safety” switch is not resettable. The battery is **DEAD.**

Step 6 – Battery Disposal

- Dispose of promptly (<30 days).
- Batteries pending disposal should not be stored with new batteries.
- Follow base regulations.



Unit HAZMAT Procedures
(Base EMD)

MCOs 4030.40a, 4140.5,
4450.12, 4450.14, and
P4030.19H

Battery Terms

- **Battery** – A device capable of storing energy (not power). A battery has a specific capacity which determines how much energy it can hold. This capacity is measured in Amp-Hours. Batteries are always rated at a specific voltage (6V, 12V, 24V, etc).
- **Amp-Hour (Ah)** – A measurement of electrical energy. A one (1) Amp draw over eight (8) hours would be 8 Ah. In general a 50 Ah battery can supply 1A for 50 hours, 2A for 25 hours.
- **State-of-Charge** – A measurement of how much energy remains in a battery, often in comparison to total battery capacity.
- **Conditioning** – A process to preserve and maintain a battery's capacity and life. Often involves a complete discharge/recharge cycle.
- **MIL SPEC** – military specification.