



Futurecom Systems Group, ULC

Battery Pack and Charger User Guide



Document Revisions

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0	Dec. 2004	FC	Preliminary Release
1	Sept. 2007	FC	220V Voltage Added
2	May 2009	FC	Added user tips for prolonged battery life
3	Oct. 2010	FC	Fixed typo on spec sheet (Appendix 1)
4	Nov. 2012	FC	Added New Company Logo
5	July 2015	AJK/SN	New charger operation and indicators
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7	July 2019	AJK/SN	Added Backup time for TRS with Booster
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Proprietary Statement

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About this Operator's Manual

This Operator's Manual provides detailed operating procedures for Battery Pack and Battery Charger products.

This document is not intended to cover the operation details of the Repeater or the Mobile Radio.

Notes, Cautions, Warnings, Dangers

Throughout this manual, you will see Notes, Cautions, Warnings and Dangers. Their meaning is as follows:



Note:

A clarifying statement that expands on the text that follows.



IMPORTANT:

An important statement that must be considered and / or implemented in order to achieve adequate equipment operation.



WARNING:

Describes a potentially hazardous situation, which **may** lead to equipment damage, death or injury.



DANGER:

Describes an imminently hazardous situation, which if not avoided, **will** result in death or serious injury.

Safety Information

DANGER!



There are **NO** user serviceable parts inside the Battery Pack or the Battery Charger. **DO NOT OPEN THE BATTERY PACK OR THE CHARGER AS LETHAL VOLTAGES ARE PRESENT INSIDE!** Only Futurecom Systems Group can service the Battery Pack and the charger.

WARNING



To ensure that Radio Frequency (RF) energy exposure to bystanders external to a repeater or mobile radio is lower than the recommended safety standards, transmit with any repeater or mobile radio only when bystanders are at least 2 meters away from a properly installed externally mounted antenna for radios with less than 50 Watts output power, or 3 meters away for radios with 50 Watts or greater power output. Refer to the RF Safety Booklet for exact distances.

WARNING



Never use the Battery Pack or attempt to charge the Battery Pack if it is damaged in any manner. If it is damaged, contact Futurecom Systems Group.

Only use chargers provided by Futurecom Systems Group for the Battery Pack. Use of any other charger could damage the Battery Pack or result in fire, electric shock or electrocution.

DO NOT store or charge the Battery Packs in locations with a warm environment.

Keep the Battery Pack dry.

DO NOT incinerate the Battery Packs.

WARNING



DO NOT enclose the Battery Pack in an airtight casing or environment. During charging and discharge the Battery Packs must have ventilation. Airtight environment could cause explosion.

WARNING



DO NOT operate the Battery Packs in explosive atmospheres, i.e., presence of flammable liquids, gases, dust or in an area where the Battery Pack could be exposed to sparks or any burning material.

Before disposing of the Battery Pack, check with your State/Province Environmental Protection Agency.

If the Battery Pack should ever become warm when charging or if it should emit a pungent odour, disconnect the charger from an AC outlet immediately and contact Futurecom Systems Group.

IMPORTANT



Before each use and before charging the Battery Pack check ventilation holes provided on the Battery Pack to make sure that holes have not been blocked or obstructed. Clean or clear any obstruction such as dirt that may obstruct ventilation.

WARNING



Do not operate charger with damaged AC power cords or DC output cords or accessories - call manufacturer to have the charger replaced immediately.

NEVER charge a frozen Battery Pack.

Locate the charger as far away from the Battery Pack as is allowed by the length of the output cable harness.

NEVER set the charger on a surface constructed from combustible material.

The charger body and power cord are waterproof. However, do not expose the AC and DC electrical connections at the ends of the power cords to rain or snow.

When handling electric power cords, always pull by the plug rather than by the cord. This will reduce the risk of damage to both the plug and the cord, and it will minimize the likelihood of electric shock resulting from that damage.

Make sure that all electric power cords are located so that they cannot be stepped on, tripped over, or otherwise subjected to damage or stress.

When leaving a battery charger connected to the Battery Pack for extended periods of time (weeks, months, etc.), periodically check the battery to see if it is unusually

warm, if it is releasing an excessive amount of gas, or is emitting an unpleasant odour. If any of these things occur, disconnect the charger from the AC electrical outlet and contact the manufacturer immediately.

WARNING



NEVER smoke or allow a source of electric spark or open flame in the vicinity of the battery or charger.

Battery Pack Overview

Principle of Operation

The Suitcase can contain either a DVRS, a PDR8000, or a Booster Pack. The Suitcase contains an internal 120V/220V AC to 13.8V DC power supply. NOTE: DVRS comes from factory with only one of 120V or 220V while the PDR8000 and the Booster Pack are compatible with both. The Battery Pack is used to supply nominal 13.8V DC power to the Suitcase where AC supply is not available.

TRS and Battery Pack Block Diagram

Figure 1 shows the Suitcase and Battery Pack block diagram.

The Battery Pack consists of 3 components: the main Battery Pack enclosure, a DC output cable (7W077X11-01 for DVRS Suitcase, or 7W077X12-01 for PDR8000 Suitcase) and the Battery Charger (3P077B01-01).

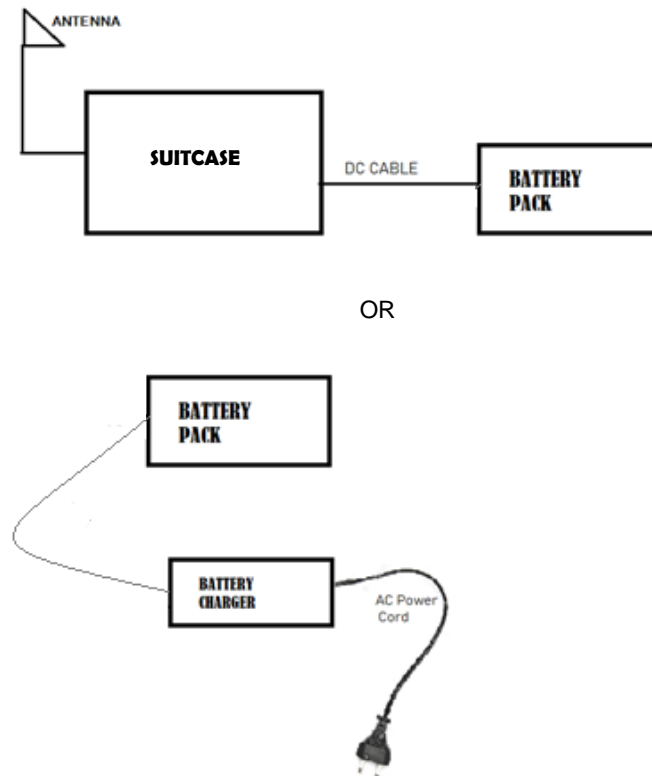


Figure 1: Suitcase and Battery Pack Block Diagram

DVRS SUITCASE NOTE: It is not recommended to connect the battery pack when the DVR-LX Suitcase is powered from AC. A discharged battery pack can be damaged. Connecting the battery pack and AC at the same time voids battery pack warranty. This limitation does not apply to the PDR8000 and Booster Pack.

Battery Pack Description

Battery Pack

The main Battery Pack enclosure contains batteries, a battery voltage indicator and a DC input/output connector. The DC output connector is connected directly to the batteries without any internal fuses.

The internal batteries are used to supply DC power to the Suitcase where AC supply is not available.

The AC to DC battery charger is used to charge the internal batteries from a 120V AC source. NOTE: A step-down transformer and an AC plug adapter (if required) are supplied for countries with 220V to 240V AC mains.



Figure 2: Battery Pack

DC Input/Output Connector

The “MIL-C-5015” style 2-contact connector is located on the side of the Battery Pack. It supplies power to the Suitcase. The DC cable (7W077X11-01 or 7W088X11-01) plugs into this connector. The other end of the DC cable plugs into the Suitcase DC input connector.

The battery charger connects to this connector for charging.



Figure 3: DC Input/Output Connector

Battery Voltage Indicator

A Battery Voltage Indicator is located on the Battery Pack Cover. See indicator on top right corner of front of case in Figure 2. The indicator shows the battery voltage:

- **RED Flashing Indicator** – battery voltage is less than approximately 10.9V.



Do not use the Battery Pack when the Battery Voltage Indicator is Flashing RED. Recharge the Battery Pack as soon as possible! Using or leaving the Battery Pack with RED Flashing Battery Voltage Indicator will severely shorten the battery life and is not covered by the Battery Pack warranty!

- **GREEN Flashing Indicator** - battery voltage is greater than 10.9V. This is the normal operating range of the Battery Pack.

Charging



Charge the Battery Pack fully before first use!

The Battery Pack must be charged whenever the Battery Voltage Indicator is Flashing RED!

The Battery Pack must be charged at room temperature (20°C-25°C)!

The battery charger must stay connected to the Battery Pack even after the battery is fully charged (float charging). This guarantees that the Battery Pack is fully charged whenever it is needed and that the Battery Voltage Indicator does not discharge the Battery Pack over a period of time.

Preparing to Charge

WARNING



- Be sure that the area around The Battery Pack and the charger is well ventilated while the Battery Pack is being charged.
- NEVER charge or store the Battery Pack in a warm environment.
 - NEVER charge the Battery Pack if it is damaged in any manner or if it has been dropped.
- NEVER charge the Battery Pack if it is damp or wet - keep it dry.
- NEVER charge or use the Battery Pack if any terminals located on the DC charging plug or the Battery Pack DC Connector are damaged in any manner or are missing.



Fig. 3 Battery Charger

Charging

- Disconnect the DC output cable from the Battery Pack.
- Plug the DC charger plug into the Battery Pack DC Connector. The DC charger plug is locked onto the Battery Pack DC Connector by rotating the locking ring clockwise.
- Plug the battery charger AC cord into a 120V AC outlet (or into a 220V to 240V AC outlet with a step down transformer and an AC plug adapter (if required)).
- A **steady AMBER light** on the battery charger indicates charging.
- A **flashing GREEN light** on the battery charger indicates that the Battery Pack is 80% charged.
- A **steady GREEN light** on the battery charger indicates that the Battery Pack is fully charged. The battery charger is in float charge mode. It takes approximately 10 hours for a fully discharged Battery Pack to be charged.
- A **flashing AMBER light** on the battery charger indicates that the charger is connected to an AC outlet. If the AMBER light continues to flash, the battery voltage is either too low (less than 3V) or the DC charger plug is not plugged into the Battery Pack properly. **Terminate the charging process immediately if the Battery Pack voltage is below 3V and contact Futurecom Systems Group!** The most likely cause is either a sulphated battery or a high resistance connection between the charger and the Battery Pack.

- Leave the Battery Pack connected to the battery charger even after it has been fully charged (float charging). Periodically check the Battery Pack during float charging to see if it is unusually warm, if it is releasing an excessive amount of gas, or if it is emitting an unpleasant odour. If any of these things occur, disconnect the charger from the AC electrical outlet and contact Futurecom Systems Group immediately.
- Unplug the AC power cord from an AC outlet ONLY when the Battery Pack is needed to be used.
- Disconnect the DC charger plug from the Battery Pack DC Connector.
- Place the DC connector cover on the Battery Pack DC Connector.
- The Battery Pack is ready for use.

Battery Pack Use



***The Battery Pack is NOT waterproof.
Make sure that the Battery Pack is not submerged into water!
Discontinue using the Battery Pack whenever the Battery Voltage
Indicator is Flashing RED!
Use the Battery Pack between -15°C and +50°C ambient temperature.***

- Remove the DC connector cover from the Battery Pack DC connector.
- Connect the Battery Pack DC output cable to the DC output connector.
- Connect the Battery Pack DC cable to the Suitcase.
- The normal Battery Pack operating range is indicated by the **GREEN Flashing Indicator** on the Battery Pack.
- **Discontinue using the Battery Pack whenever the Indicator is Flashing RED! Recharge the Battery Pack as soon as possible.**
- Power down the Suitcase and disconnect the Battery Pack DC cable from the Suitcase.
- Disconnect the Battery Pack DC output cable from the DC output connector.
- Place the DC connector cover on the DC connector.

Cycle Life

The Battery Pack cycle life is dependent on numerous factors: depth of discharge during each use, charging habits and ambient temperature. Providing an exact number to the cycle life versus depth of discharge is impossible given all variables that may apply. However, in general terms, the following is achieved on a consistent basis: for depth of discharge 80% or greater - 100-200 cycles, for 50% depth of discharge - 500 cycles, for 30% depth of discharge - up to 1000 cycles.

Table 1: Battery Back Up Time

SUITCASE TYPE	OUTPUT POWER OF SUITCASE	BACK UP TIME (at 50:50 Tx-Rx Duty Cycle)
DVR-LX with Low Power MSU	700-5W, VHF-6W, 800/UHF-10W	2.5 hours
DVR-LX with Mid Power MSU	700/UHF/VHF-5W, 800-10W	2 hours
PDR8000	20W	7.5 hours
Booster Pack	50W	3.5 hours

Charging Instructions

Option A: For the Longest Cycle Life:

The user **MUST** recharge the battery pack after every use, even if the green light is still flashing. The user should leave the battery pack on the charger permanently until needing to use it.

Option B: If Battery Pack not left on Charger Permanently:

Monthly charging maintenance schedule: The battery pack should be recharged once a month. Every second month, it should be discharged 20% first and then fully recharged.

Storage

Recommended storage temperature is 25°C (77°F). Do not store the Battery Pack under direct sunlight or in high temperatures exceeding 60°C (140°F).

The Battery Pack will self-discharge during storage. It should be charged at least once a month or preferably left float charging.

IMPORTANT



If the Battery Pack has been stored for a long period in a discharged state (without monthly recharge), it may not be able to regain capacity even if it is recharged. It is recommended to periodically use the Battery Pack and recharge it even if in a stored state. Recharge the Battery Pack at least once a month.

Frequently Asked Questions

How often should I charge the Battery Pack?

The Battery Pack should be placed on charge after every use regardless of the discharge status of the Battery Pack.

NOTE:

Failure to charge the Battery Pack after every use, regardless of discharge status, will shorten the life cycle of the Battery Pack.

How long will it take to charge the Battery Pack?

Recharge time is a function of the depth of discharge. A fully discharged new Battery Pack is recharged in about 10 hours.

How long will the Battery Pack power the Suitcase?

The Suitcase back up time depends on many variables: Suitcase Tx-Rx duty ratio, temperature, age of batteries, previous depths of discharge, charging patterns, etc. Refer to Table 1: Battery Back Up Time.

Can I leave my Battery Pack on charge?

The battery charger is an automatic charger and as long as AC input is provided, it should be left on charge when not in use. However, always periodically monitor charger and the Battery Pack. Check the Battery Pack to see if it is unusually warm, if it is releasing an excessive amount of gas, or is emitting an unpleasant odour. If any of these things occur, disconnect the charger from the electrical outlet and contact Futurecom Systems Group immediately.

APPENDIX 1-Battery Pack and Charger Specifications

General Specifications	
Backup Time for Suitcase DVR-LX w Low Power MSU DVR-LX w Mid Power MSU PDR800 Booster Pack	Refer to Table 1: Battery Back Up Time 2.5 hours 2 hours 7.5 hours 3.5 hours
Dimensions Height / Width / Depth Battery Pack Battery Charger	245mm (9.65") / 280mm (11.0") / 175mm (6.9") 51mm (2.0") / 127mm (5.0") / 124.5mm (4.9")
Weight Battery Pack Battery Charger	13.0kg (28.5lb) 1.8kg (4.0lb)
Battery Charger AC Input Voltage	100V AC – 132V AC, 50Hz – 60Hz 200V AC – 240V AC with Step Down Transformer
Battery Pack DC Output Voltage Range	10.9V DC – 13.8V DC
Output DC Cable 7W077X11-01 7W077X12-01 7W088X11-01	TRS Cable Motorola DC Power Cable PDR8000 DC Cable
Charging Temperature	+20°C to +25°C (+68°F to +77°F)
Operating Temperature	-15°C to +50°C (+5°F to +122°F)
Storage Temperature	+25°C (+77°F)
Charger Compliance Charger DC Plug Compliance	UL 1236 and CSA 22.2 MIL-C-5015
Connectors Battery Pack DC Output Charger AC Input Charger DC Output	CA3102E16-11SB, "MIL-C-5015" Bayonet NEMA 5-15P Three Prong AC Plug CA3106E16-11PB, "MIL-C-5015" Bayonet
Battery Pack Output Voltage Indicator Flashing RED Flashing GREEN	< 10.9V DC approx. > 10.9V DC approx.
Charger Indicator AMBER Flashing GREEN GREEN Flashing AMBER	Charging Battery Pack 80% Charged Battery Pack Charged, Float Charging Error
Charger Features	Short Circuit Protection Spark Proof
Charging Time	10 hours approx.
Float Charge	Required

NOTES



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