

## 4. ELECTRONIC EQUIPMENT CARE AND MAINTENANCE



We use an electronic data collection system for tortoise monitoring to enhance the accuracy, validity and integrity of the data you collect. An electronic data collection system, over a solely paper based system, allows us to : 1) reduce data entry errors, of which a misspelled word is an error (carcass and carcas are not the same), by providing such tools as look up lists and drop down menus, 2) eliminate the need to hand enter data and thus its associated problems (e.g. data entry errors due to repetitive tasks, undecipherable data from poor hand writing, lost data sheets), 3) reduce the time from field data collection to data assessment, final QA/QC and analysis, 4) enhance QA/QC by automating certain operations directly in the field and providing in-office QA/QC tools, both of which assist the contractor in providing USFWS the best data possible, and 5) automate, and thus significantly reduce errors, in spatial data collection (i.e. GPS grabs).

The **goal** of Electronic Equipment Care and Maintenance training is to enable you to confidently and correctly care for and operate the data collection equipment in your duties as a tortoise monitor. This portion of the training does not deal with what data to collect (e.g. MCL) or how to collect it (e.g. tape measure, calipers, etc.), but how to operate and care for the equipment at a basic level. The outline below details the individual objectives and standards, as well as the final metric for which you will be held accountable after completing this training.

**Objective 1:** Proficiency with basic RDA operations.

You are responsible for ensuring that your RDA is operational and correctly set up each day. Each crew member will know how to

1. set up the RDA (e.g. charge, turn on/off, set date/time, components of RDA)
2. navigate menus
3. back up data
4. restore data
5. maintain the unit
6. troubleshoot common RDA problems through a soft reset or a hard reset.

**Objective 2:** Proficiency with basic Bluetooth GPS operations.

You are responsible for ensuring that your Bluetooth GPS is operational each day. Each crew member will know

1. how to set up the Bluetooth GPS unit (charge, turn on/off, identify components)
2. what the various lights on the unit mean
3. how to maintain the unit.

**Metrics:** During the last week of training you will be asked to demonstrate for an instructor how to set the RDA date and time; back up data; perform a soft reset; perform a hard reset and restore data and Pendragon Forms; and un-pair and re-pair your RDA and Bluetooth GPS (covered in later sections). You must successfully perform all tasks. Individuals will be given two opportunities to pass. If they fail both times they will be considered unsuitable as desert tortoise monitors and it will be recommended to USFWS that they not participate in sampling.

## Objective 1: Understanding Basic RDA operations



### 1. Setting up the RDA

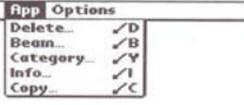
- **Components**
  - i. the RDA itself,
  - ii. communications cable used to connect to the computer,
  - iii. AC adaptor cable used for charging, and
  - iv. stylus, which is stored on the unit and used for tapping and entering data on the screen.
- **Charging the unit:** Connect the AC adaptor to the bottom of the communications cable port and connect the blue prongs of the communications cable to the communications charging port on the bottom of the RDA (see below). Plug the AC adaptor into a wall outlet. For safety reasons, make sure the RDA is **completely dry** before plugging it in. On a completely drained battery, charging time takes about 2 hours. The charger shuts off when completely charged, so it is safe to leave the unit plugged in overnight.



You can tell how full the battery is by following these steps:

- i. Turn RDA on (see next bullet)
  - ii. From the main Application Launcher (Tap Home  if necessary) tap  Device Info
  - iii. Tap Next. This screen shows you battery information, most importantly Battery Percentage (92% = battery is 92% full). Charger Status and Input is also useful to see where in the charging process your RDA is.
  - iv. Tap Home  to return to the application launcher.
- **Turn the unit on or off:** Briefly press and release the Power button . When you turn the unit on, it will return to the screen you were previously working with unless the battery has been drained or it has been turned off for an extended period of time. To conserve battery power, always turn unit off when not in use (i.e. between waypoints).
  - **Setting Date and Time:** Turn unit on and tap the Home icon  if necessary, until the Prefs icon  is available. Tap Prefs. Tap the drop down menu in the upper right hand corner and tap Date & Time. Tap the date to set it (make sure you're in the right year), tap the time to set it, tap the time zone to set it.
  - **Screen Contrast:** Briefly press the Backlight button  to turn the backlight on or off. Use the backlight to illuminate the screen in low-light situations (drains the battery faster). You can also access the screen contrast control through the Backlight button. Press and hold the Backlight button until the contrast slider appears on the screen and, with the stylus, drag the slider to your desired contrast level, or use the up and down buttons. Tap done when finished.

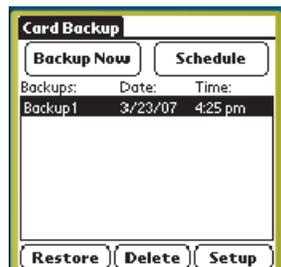
2. **Navigate Menus:** Menus on the RDA are navigated largely by using the stylus and gently tapping the desired icon on the screen. Commonly used icons and menus are detailed below.

	<b>Home Icon:</b> Tapping the Home icon will take you to the last category open on the Applications Launcher screen. By tapping this icon repeatedly, you will rotate through the application categories. If lost within the RDA, tap Home.
	<b>Options Icon:</b> Tapping the Options icon will activate the Menu Bar, which will appear at the top of the screen. From the Menu Bar, applications and data can be managed.
	<b>Calculator Icon:</b> This icon will open up the Calculator application, where you can find out the square root of 253, figure out how many yards of tortoise you have found in a week, or compute any other calculation. Probably not necessary.
	<b>Find Icon:</b> Tap this icon and you will be prompted to enter text that to search every application for. Probably not necessary.
	<b>Menu Bar:</b> The menu bar contains a set of menu commands specific to the application and is accessed through the Options icon, mentioned above. For example, the deletion of a record is done within Pendragon Forms (Forms 5.1  ).

	<p><b>Application Icons:</b> By tapping on an application icon, you will launch that application. The applications you will use every single day you are in the field are Forms 5.1 (Pendragon Forms) and CardBkup. Your quality control specialist will become very familiar with the HotSync app, but other than that, you probably will not use any other applications.</p>
	<p><b>ABC Dot:</b> When tapped, the ABC Dot in the input area activates the alphabetic keyboard, allowing for text to be entered. The cursor, must be in an input field for this icon to work.</p>
	<p><b>123 Dot:</b> When tapped, the 123 Dot in the input area displays the numeric keyboard. Like the ABC Dot, this option only works when the cursor is in an input field.</p>
	<p><b>Pick Lists:</b> When a black triangle appears next to text, the text is a pick list and has a drop down menu. It is accessed by tapping the text or arrow, after which you select (tap) an item on the list.</p>
	<p><b>Scroll Bars/Buttons and Next/Previous Buttons:</b> When the contents of an application take up more than one screen, the scroll bars will be enabled so you can view all the data. Tap and hold down the scroll bar then slide it up or down to scroll through data, or tap the slider arrow at either end to move one line at a time. By physically pressing the up or down buttons on the front of the RDA, you can also scroll through data. By tapping the next/previous arrows, the previous or next page of information will be displayed.</p>
	<p><b>Text and Number Input Areas:</b> These areas of the Graffiti Pad allow you to enter information as if you were writing with a pen. You'll learn more about entering data via the Graffiti Pad in Standard 3, Objective 3 of Pendragon Forms and Database training module.</p>

- Back up data:** The equipment you will be using is good, but not perfect; and at some point during your monitoring duties, chances are high that your RDA will either run out of batteries or freeze up and require a hard reset (described in Standard 6 of this objective), losing all data and non-default applications. Because of this, **creating backups of and restoring the data you collect while walking transects is crucial.** You are expected to backup your data after collecting **every** point and to know how to restore it on your own. It is simple to do, takes only a couple of seconds, and will save you from having to re-enter or re-collect data if your RDA crashes or runs out of juice. Here's how:

  - From the main application launcher screen (tap Home  if need be), tap CardBkup 
  - Tap "Backup now".



- Go with the default Backup Name (“Backup 1”, typically) and tap Begin Backup
- The message “Backup Complete” will appear, along with the number of databases backed up, which varies. Tap Done to return to the CardBkup application and the Home icon to return to the application launcher menu.



- The next time you make a backup, follow the previous steps, keeping with the same name of “Backup 1”. This way, instead of building up a bunch of backups, you’ll replace the old one with a backup that contains the data already backed up, plus the data just collected.
4. **Restore data and Pendragon Forms:** Your RDA has crashed and you had to run a Hard Reset (explained in Standard 6 of this objective), after which Pendragon Forms (Forms 5.1 ) is no longer available and your data is gone. Don’t panic, this happens from time to time. As long as you’ve been taking regular backups, you’ll be back on the line in no time, just follow these steps:
- From the main application launcher screen (tap Home  if need be), tap CardBkup 
  - Make sure your most recent backup is selected (if you’ve been naming them as described above, there should only be one) and tap Restore.



- Tap Full Restore. The screen will display the progress of the restore.



- The RDA must go through a soft reset (see *Troubleshoot Common RDA Problems* below) for the restore process to be complete. Tap Reset Now. You will be prompted to set the date and time, which should already be correct, but double check it.
- Everything should be back to normal, but you'll probably have to re-collect whatever data you were working on when the RDA froze and reenter anything that was not backed up.

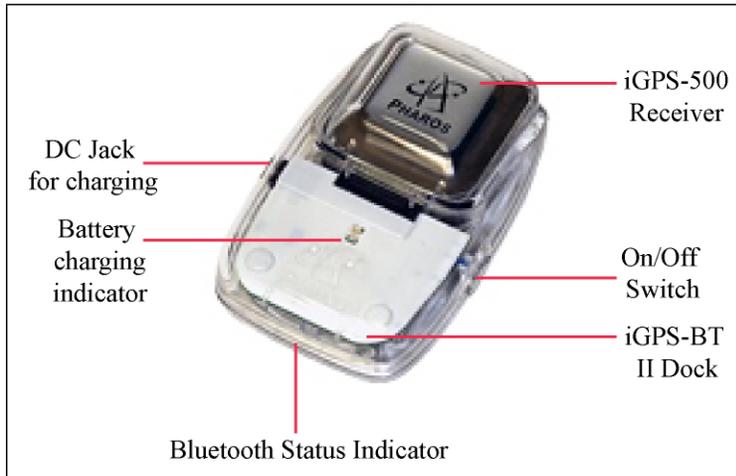
**NOTE:** Perform a restore only after data loss (i.e. dead battery, hard reset); do not use the restore function as a means to undo mistakes.

5. **Maintaining Your RDA:** RDA stands for Rugged Digital Assistant. It is basically a typical Personal Digital Assistant (PDA), just suited up for an extended hiking trip. They are supposedly water proof, dust proof, and can withstand drops better than the predecessor (avoid testing these assertions at all costs, though). They are not, however, indestructible and are expensive pieces of equipment that need to be maintained and kept in the best working order. To do so, follow these steps:

- **Keep the screen clean.** Touch-screens are great, but present a whole host of problems when used in the field. They scratch very easily and lose their sensitivity if used roughly. The RDA is useless for our purposes without the functionality of the screen. Here are some tips for screen care:
  - i. A screen cover can be made by cutting a piece of sturdy plastic (Tupperware containers work well) so it completely covers the screen and taping it along the top to the RDA (never tape anything directly to the screen). That way you can lift the cover to enter data without having to remove it.
  - ii. The provided **stylus** is the **only** object that you should ever use to tap or write on the screen. Do not use your fingernail, a pen cap, a twig, a pencil, or any other object you might think is suitable; they are not and will only scratch the screen. Carry extra styli with you, they come cheap from any computer store.
  - iii. If the screen or the stylus is dusty or dirty, gently wipe them down with a clean cloth, damp if possible. One speck of dust on either the screen or the stylus is all it takes to scratch the screen.
  - iv. When stowing the RDA in your backpack, be aware of its placement. In the past, many screens have been ruined simply by the way they're carried around or stored. Do not store the RDA in your backpack and then use your backpack as a chair.
- **Cleaning and storing the RDA:** You and your RDA are likely to encounter dirt and mud, if you are lucky enough to be rained on while walking transects. To clean the RDA, use a clean, damp cloth or, if really dirty, a soft bristle brush (do not use on screen). Make sure the RDA is completely dry before charging or operating. Store in a cool, dry place.
- **Battery Care:**
  - i. The RDA comes with a custom rechargeable Lithium Ion battery pack. You should never remove or handle the RDA's battery pack. For that matter, you should never attempt to remove the RDA's blue outer case.

- ii. Use only the provided cables and AC adaptor to charge the unit. The battery is capable of lasting up to 60 hours on a charge, but with the use of the Bluetooth GPS unit and other programs within the RDA, average battery life can be as low as 8 hours.
  - iii. If possible, charge every night and avoid fully discharging the battery. Unlike most rechargeable batteries, Lithium Ion batteries will have a longer life span when consistently only partially drained.
  - iv. Again, make sure the unit and cables are **completely dry** before plugging into an electrical source. Clean connections with a clean, dry cloth or compressed air, taking care not to freeze anything.
6. **Troubleshoot Common RDA Problems:** There are two typical ways to trouble shoot a non-responsive RDA: a soft reset and a hard reset. Try the soft reset first and if that doesn't do the trick, try a hard reset. If the problem persists, speak with your technical manager about possible resolutions.
- **Soft Reset:** A soft reset gives the RDA a fresh start, similar to rebooting a computer, without deleting any data or applications. Because all data is maintained, you do not need to run a restore after performing the soft reset. You may, however, need to recollect any data you were working on when the RDA froze. To perform a soft reset, simply press and release the Power  and Backlight  buttons together. The RDA will reset to the Date and Time screen, double check that they are correct.
  - **Hard Reset:** Do not perform a hard reset unless a soft reset does not solve the problem. A hard reset restores the RDA to its default, factory settings, deleting all data, applications, and customizations that have been added. If you have been creating a backup after every point, you can easily restore everything you need to complete the transect. Here's how to perform a hard reset:
    - i. Press and hold the Power  and Backlight  buttons together for a second or two, then release the Backlight button only.
    - ii. When the "Palm Powered" logo appears, release the Power button.
    - iii. When prompted, press the up button to erase all data and fully reset the RDA.
    - iv. Follow the setup steps and, though a hard reset should not affect the time settings, double check that the date and time are set correctly.
    - v. Follow the steps previously outlined in *Restore Data and Pendragon Forms* to restore your data and applications.

## Objective 2: Understanding Basic Bluetooth GPS Operations



### 1. Setting up the Bluetooth GPS

- **Components**

- i. the iGPS-500 Receiver
- ii. the iGPS-BT II Dock
- iii. the charging cable (pictured at right)



- **Charging the unit:** Connect the USB charging cable to the DC Jack of the Bluetooth GPS dock and plug the USB end into a turned-on computer's USB port. On a drained battery, the unit takes 2 to 3 hours to charge. Once charged, do not leave plugged in.
- **Turn the unit on or off:** To turn the unit on, slide the On/Off switch up. Slide the switch down to turn it off.

### 2. Bluetooth GPS Indicator Lights: There are two lights on the GPS unit that let you know its status.

- The Bluetooth Status Indicator (Internal Blue LED, located at the bottom of the unit)
  - i. When blinking, the unit is searching for a Bluetooth signal, which in our case, will come from your RDA (and any other Bluetooth enabled device). With continued use of the GPS the connection between it and the RDA is often severed. If you find your GPS light blinking between uses, turn it off and then back on and it should reconnect with your RDA. Better yet, to help save battery life, turn it off between uses.
  - ii. When steady, communication between the GPS unit and another Bluetooth enabled device (the RDA) has been established.
  - iii. This light is only active when the unit is turned on. If the light does not indicate when you turn the unit on, the battery is most likely dead.
- Battery Charging Indicator (Orange/Green LED, located on the front of the unit)
  - i. When orange, the unit is charging.
  - ii. When green, the unit is fully charged.
  - iii. This light is only active when the unit is plugged in to charge.

3. **Maintaining Your Bluetooth GPS Unit:** The sole purpose of the Bluetooth GPS unit is to take GPS location data and automatically transfer it to the RDA, eliminating the errors and inaccuracies that arise from entering coordinates by hand. For purposes beyond monitoring and transect sampling, spatial data is important and your GPS must be properly cared for to ensure that it functions correctly.
- The unit is small and easily misplaced; take precautions to keep track of it while in the field.
  - The dock and the receiver slide apart and can be separated, but this should not be necessary and should be done infrequently, if ever. Do not store the two separated, keep them together.
  - If the dock and the receiver are separated, do not touch the connectors with fingers or other objects, which could result in the failure of the unit. If the connection appears dirty, gently wipe down with a clean, **dry**, soft cloth and spray clean with compressed air as necessary, being careful not to freeze the connections or the unit itself.
  - Do not leave the unit in direct sunlight for an extended period of time.
  - Unlike the RDA, the Bluetooth GPS is not ruggedized and is not water, dust, or drop resistant. Take extra care to keep the unit away from moisture, dust, and opportunities for harmful impact.
  - Do not over-charge the Bluetooth GPS unit. Unplug it as soon as the charging indicator turns green.
  - The GPS unit, like the RDA, has rechargeable lithium ion batteries and therefore will have an extended life if not regularly completely discharged or only partially charged. If possible, allow time to recharge fully every night and switch the unit off when not in use (i.e. in between waypoints)
  - Store the unit in a dry, cool place.