TDR-Mk9 User Guide

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Overview of Mk9 Functionality

The Wildlife Computers Mk9 archival tag samples and stores depth, relative light-level and temperature data. The Mk9 must be recovered in order to retrieve the collected data, thus it is suitable for attachment on animals that can be recaptured, as well as fishing and oceanographic gear.

Mk9s are available in a variety of shapes to best conform to the study animal or gear. Generally, the researcher determines the best attachment method.

There are two basic styles of Mk9s. One style is designed to be externally mounted on the study animal. The other can be implanted in the study animal. External Mk9s include a wet/dry sensor which can be used to control the sampling protocols. Internal Mk9s can include a sensor stalk which exits the animal's body, thus allowing the sampling of environmental temperature and light level.

The full archival record is maintained in non-volatile memory. These data can provide the following information about the tagged animal:

- Its environmental preferences in terms of depth and temperature
- Its geographic location derived from times of sunrise and sunset

Tag Diagram

External Mk9 Top View

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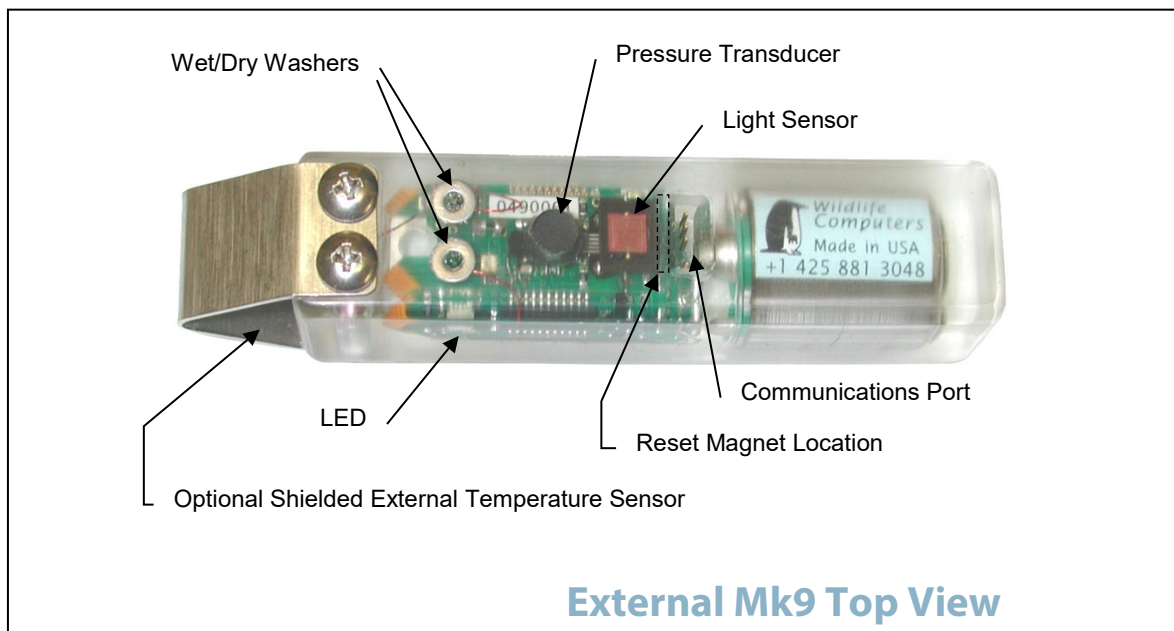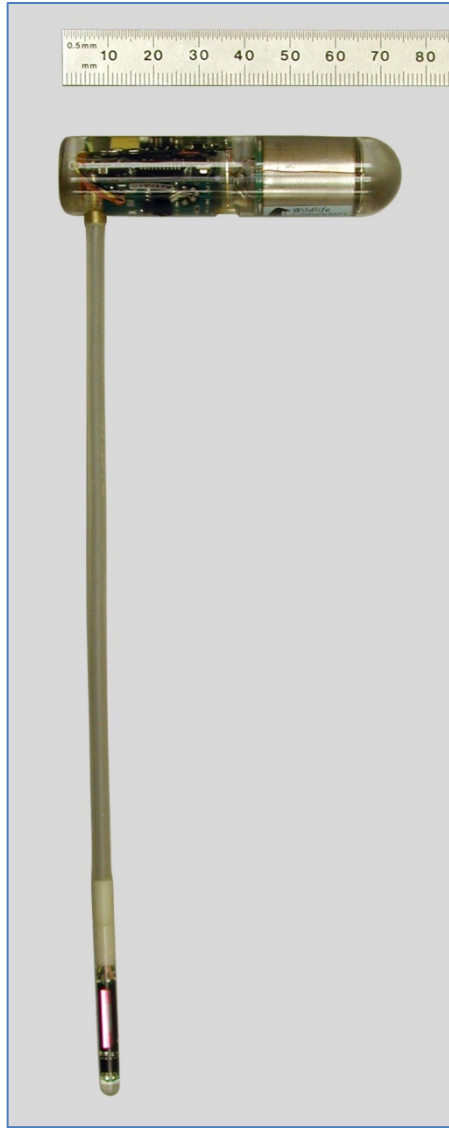
Left: Example of an implantable Mk9 tag in the L-configuration with light sensor and one of two temperature sensors in the stalk.

Below: Example of an external Mk9 tag without optional fast-response temperature sensor.
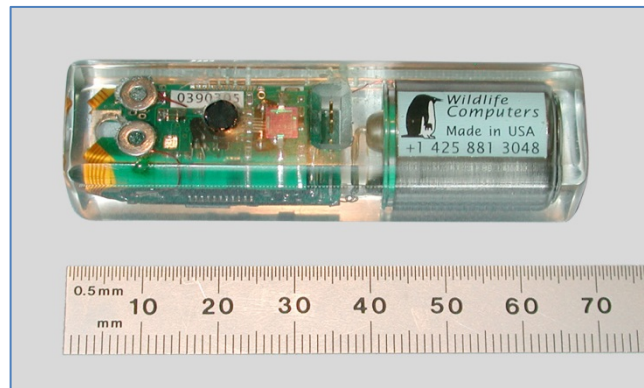
How Data are Collected

Data Collection Intervals

Data can be sampled every 1 to 255 seconds as standard. Special versions of the Mk9 can sample data as fast as once every $1/64^{th}$ of a second. Each sensor can be sampled at an independent rate.

Resolution of the Sensors

The resolution of the stored data depends upon the sensor and memory mode. A "Hardware Configuration Report" is provided with the Mk9 that documents the range and resolution of each sensor. This report can be viewed, saved, and printed by the user while communicating with the Mk9.

Decoding the Data

Wildlife Computers provides a data analysis program, WC-DAP, to decode and display the data downloaded from a recovered tag.

A Word on Version Numbers

The Mk9's on-board software can be upgraded. Code upgrades are done in the Wildlife Computers lab. (Please contact us for instructions if you need a code upgrade in your Mk9 tag.) Mk9Host is upgraded in parallel. In order to keep the version of on-board software (Mk9Ware) and Mk9Host working seamlessly together, please note the following:

- The Mk9Ware version numbers are in this format: ***x.yy***

- Mk9Host has version numbers in this format ***a.bb.cccc***

- When attempting to communicate with a Mk9 tag use the following rules:

    o ***a*** must be the same as ***x***

    o ***bb*** must be greater than or equal to ***yy***

- It is best to use highest ***cccc*** available – see our web site wildlifecomputers.com for the most up-to-date Mk9Host

Special care must be taken when communicating with Mk9s with different versions of Mk9Ware. All versions of Mk9Host will refuse to communicate with an inappropriate Mk9 tag and will tell you why.

Communication with the Mk9

User parameters are programmed into the Mk9 via a Windows-based program provided by Wildlife Computers called Mk9Host. Mk9Host must be installed on your PC. Versions of Windows earlier than Windows 2000 Windows may or may not work, depending on the configuration of your PC. We do not support other operating systems (e.g., UNIX) or Windows emulators.

Install Mk9Host on your PC from our web site, wildlifecomputers.com following the prompts.

Mk9Host synchronizes communications with the Mk9's on-board software. It sends and receives commands to the Mk9. Parameters are downloaded from the Mk9 to your PC. Mk9Host allows you to modify those parameters. Once the parameters are set, they can be uploaded to the Mk9.

The Mk9 is connected to your PC via a **Wildlife Computers Communications Cable,** available from Wildlife Computers only. The USB communications cable connects to a USB port on your PC. The driver for the USB communications cable is available for download on our website. You will need to install this driver and plug in the communications cable before you open Mk9Host.

It is always advisable to make sure that your computer and all connections function properly before you leave the lab and head into the field.

Configuring Mk9Host to Your PC

*Be sure that the USB driver is installed and the USB communications cable is plugged in prior to opening Mk9Host.

Each time you start Mk9Host, you will be greeted with a Welcome screen.

If you are using a USB communications cable, you should see the COM/USB box in the middle. Click OK.
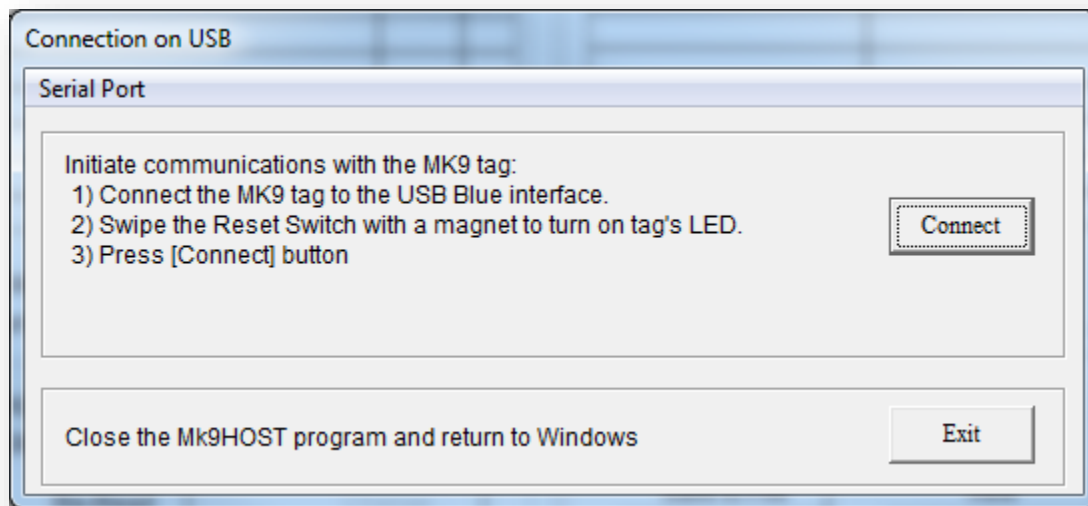
Connecting the Mk9 to your PC

Carefully insert the flat plug from the USB communications cable into the Mk9's communications port. Note the orientation of the pins in the communications port. There are three pins in sequence, a "missing pin," and a single pin. (See diagram on page 4.) Note the orientation of the sockets in the flat plug. One of the sockets is blocked. *It is critically important to ensure the flat plug is correctly oriented to the pins in the communications port before inserting the plug.*

Initiate Communications with the Mk9

Follow the instructions displayed on the Connection screen. Note that if the cables between the PC, the USB communications cable and Mk9 are connected correctly a LED on the Mk9 will glow. The LED must be glowing before clicking the Connect button. Mk9Host may display additional prompts if there are difficulties in establishing communications.

⚠️ *CAUTION: Do not leave the Mk9 tag hooked up to the communications hardware any longer than necessary to set up or download the tag. Leaving the tag hooked up to the communications hardware for extended periods of time will cause a more rapid drain on the battery.*

Connection on USB

Serial Port

Initiate communications with the MK9 tag:
1) Connect the MK9 tag to the USB Blue interface.
2) Swipe the Reset Switch with a magnet to turn on tag's LED.
3) Press [Connect] button

[Connect]

Close the Mk9HOST program and return to Windows   [Exit]
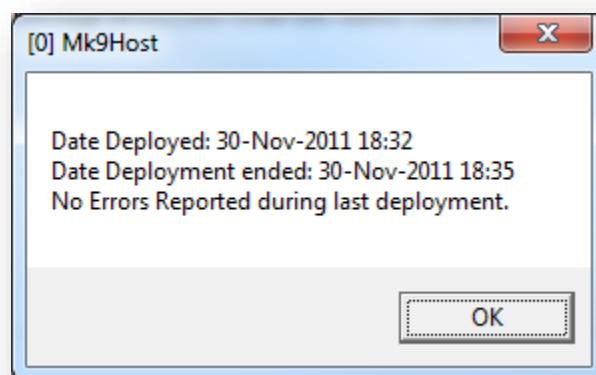

Log onto the Mk9

After initial communications are established, you need to Logon to your Mk9 tag. You must correctly enter your password and log on as Owner in order to read and update information from the Mk9. **The default password for all Mk9 tags is Mk9**. The password is not case sensitive.

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You can change your password any time after you have logged on as a user. Acceptable passwords include entries up to 31 characters. If you forget your password, you will have to return the tag to Wildlife Computers so we can reset it.

If you do not know the password, you will only be able to see general information. You cannot change any data or access any of the tag's functions. Your only option after viewing the general information is to click on Standby.
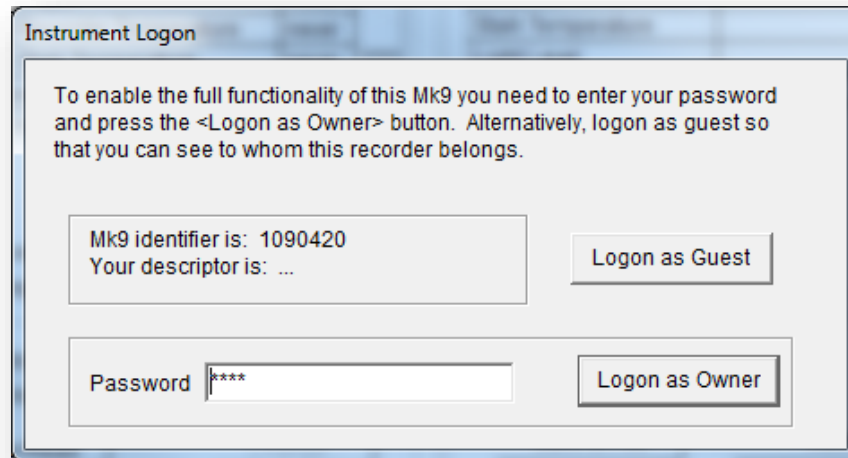
Once you have successfully logged onto the Mk9, an informational screen similar to the following will display.

Setting Up the Mk9 for Deployment

Main Screen

This screen provides the main interface with the Mk9. It is divided into 4 areas:

Setup Tag	Defines how the Mk9 will collect data on <u>next</u> deployment. Has sub-areas to set sampling intervals and for setting the on-board clock. Contains buttons for generating reports and deploying the Mk9.
Test Sensors	Sends a command to sample the sensors and display what they are <u>currently</u> measuring.
Retrieve Collected Data	Sends a command to download data to your PC from the <u>last</u> deployment. You can view a limited amount of data on-screen or save entire file to disk.
Identify Tag	Shows system and user-defined identifiers.

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Setup Tag

⚠️ *CAUTION: If the Mk9 has important data from a deployment that has not been downloaded, follow instructions in the section on Recovering Collected Data before changing any parameters*

Determine the Data Collection Intervals (Sampling Protocol)

Determine how you want the Mk9 to sample.

- Decide sampling rate. Establish the rate each sensor needs to be sampled in order to meet your experiment's criteria, and how long you expect the deployment to last.

- You have the option to use one- or two-byte depth and temperature readings. One-byte readings use scaling tables to conserve memory space, using user-defined resolution of the sensors. Two-byte readings give you the full 12-bit resolution over the entire range of the sensor but use twice as much memory. Given the large amount of memory present on these recorders, we generally recommend using the two-byte readings.

- Determine amount of memory that will be used during the deployment. You need to do some arithmetic.

    - The amount of memory available for data storage is at least 64 MB, which allows the Mk9 to store about 50 million samples (sensor readings). Each sample occupies one or two bytes of memory, depending on how the data compress. The memory will allow 5 years of data to be stored when sampling depth, temperature and light-level every 10 seconds.

    - Depth, Recorder Temp and External Temp samples are 2-Bytes each, Light Level, Wet/Dry and Battery Voltage are 1-Byte each.

    - If there is not enough memory to store the readings at the rate you need, you will need to sample the sensors less frequently.

    - If there is more than enough memory to store the readings at the rate you need, you can increase the sampling rate and get more detail.

Set the Data Collection Intervals

Set the sampling for each sensor by clicking on specific areas in the Data Collection Intervals frame:

- Click on the sensor name to select one- or two-byte data sampling.

- Click on the sampling interval and chose from the drop-down list of available intervals. Note that all intervals are in seconds.

- Click on the sampling condition text to choose between sampling all the time or only when wet. If your recorder does not have wet/dry sensors, you will not be able to change to sampling only when wet.

Copying Data Collection Intervals from One Mk9 to Another

The **SAVE SETUP** button is useful if you are setting up a series of Mk9 tags and wish them all to have the same (or very similar) setup. Setup the first Mk9 tag and then click this button. As long as you don't leave Mk9Host, you can use the **RECOVER SETUP** button on subsequent Mk9 tags to set all of the data collection intervals to be the same. Note that the Save Setup and Recover Setup only copy the data collection intervals and sampling condition.

Set Mk9 Time and Date

It is important to accurately set the Mk9 time to GMT. Neglecting to do so will make subsequent data analysis more difficult. The time displayed on the Main Screen is from the Mk9's clock. This display can be refreshed (re-read from the Mk9) by clicking the **RE-READ** button on the General Tab screen.

There are two ways to set the tag's clock. The best and most accurate way is to use the clock on your PC. First ensure the clock on your PC is accurate. There are several web sites that allow you to do this. Alternatively, in Windows, select "Date and Time" in Control Panel, then select the "Internet Time" tab, and follow the instructions.

Click the **CHANGE** button on the Main screen to bring up the window to set the Mk9's clock.

Automatic Settings from PC's Clock

Mk9Host will read the local settings of your computer and fill in the GMT offset. If you need to override this, select the number of hours that need to be **added** to the time on your PC's clock to match GMT. For example, if your PC is set to GMT -8, select "8" in the drop-down box.

Click Update in the Automatic setting frame.

Manual Setting of Time and Date
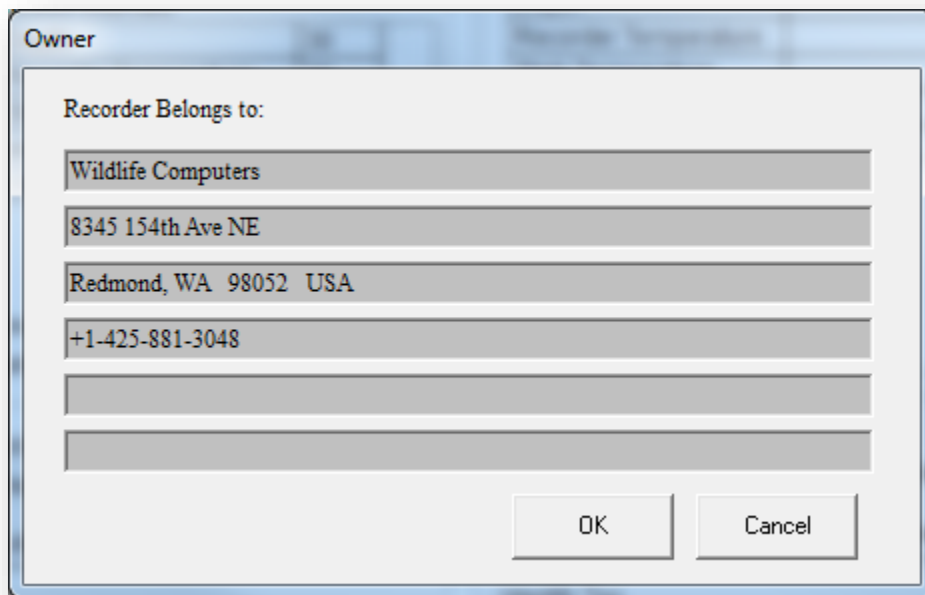
Alternately, enter the appropriate GMT date and time using an accurate time source, clicking Update (in the Manual setting frame) to set the tag's time and date to these values.

Identify Instrument

User-Defined Identifier

This is an optional parameter. It can be used to identify the deployment. This identifier will be displayed along with the data downloaded from the Mk9 upon recovery.

OWNER will reflect the specific contact information for each individual user.

Test Sensors

- Click on the **Test** button in the Test Sensors box. The Mk9Host sends a command to the Mk9 to sample each sensor every 2 seconds.

- You can warm up the temperature sensor and put the Mk9 into a dark place to verify that the sensors are reading reasonable values.

  > Depth: -5 to +5m (corrections to the depth with zero-offset are done when the data are analyzed)

  > Temperature: current temperature

  > Light Level: ~50 (cover light sensor) to ~180 (bright room)

  > Battery Voltage: greater than 3.0V

- Click on the Stop button when you are done.

Set Wet/Dry Threshold

The wet/dry sensor for the Mk9 can be tuned for the salinity of the particular environment in which it will be deployed. If you are using the sampling condition "Sample only when wet", it is important that you verify the default threshold is appropriate for your particular environment. Note this is only applicable if you are using the "Sample only when wet" condition.

The Mk9 determines whether it is "wet" or "dry" based on the seawater resistance measured across the wet/dry washers. The lower the salinity, the higher the seawater resistance will read. The Mk9 has a wet/dry threshold parameter. This parameter is set to a default value that should be appropriate for most marine environments.
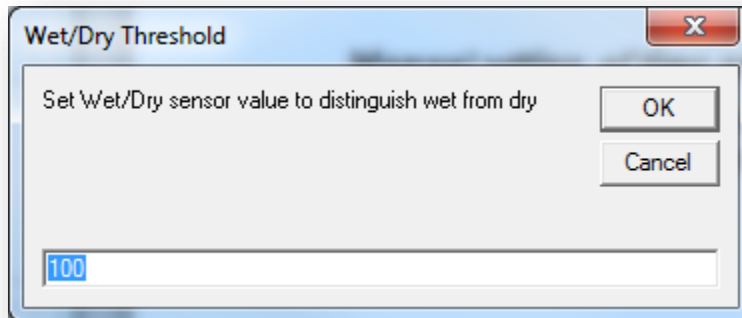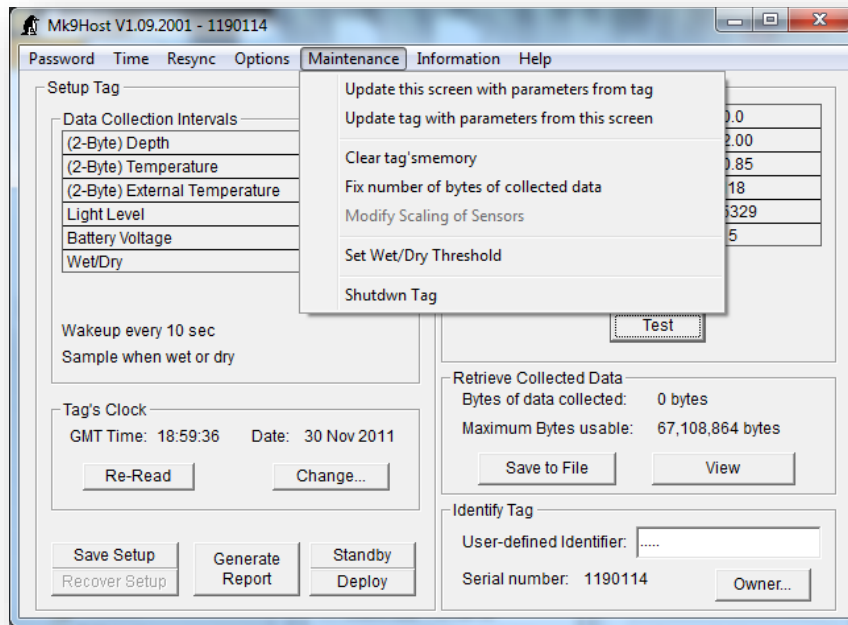
It is recommended that you verify this threshold is appropriate for the salinity of your study area. Set the Mk9 to sample the wet/dry sensor, ensuring the "Sample when wet or dry" condition is set. Immerse it in a bucket of the local seawater for a few minutes, then let it sample in air. Download the data and note the conductivity sensor values for the readings taken in the seawater. The *Wet/Dry threshold* should be set to twice this value, but no lower than 40, and no higher than about 150. Set the Mk9 to sample again, this time using the "Sample only when wet" condition. Ensure the Mk9 appropriately samples when immersed in seawater and suspends sampling (standby mode) when removed from the seawater.

Create Hardware Configuration Report

It is important to archive the configuration of the Mk9 (versions, parameters) prior to deployment so that they can be used to correctly analyze the data. Click the **GENERATE REPORT** button. The following screen will display the configuration of the Mk9 that is held by Mk9Host on your PC.

The *File* menu item allows you to save and/or print this report.

You should always save a copy of the report and review all parameters before deployment. The success of your experiment depends upon the correct setup of all parameters. Selecting this configuration report function only displays the Mk9 parameters stored by the Mk9Host on the PC, not necessarily on the Mk9. It does not perform any upload function. When running the report, the Mk9Host will indicate if the report shows a change from what is on the Mk9. If so, be sure to save the changes when you exit or deploy.

Exiting Communications/Preparing the Mk9 for Deployment

Standby or Deploy the Mk9

Once the Mk9 has been set up, you must exit communications. *Always* click on the **Standby** or **Deploy** buttons to exit.

a) *To deploy and collect new data:* Click on the **Deploy** button. When you exit using this command, the Mk9 will begin the sampling regime.

- If you have made changes to any parameters, you <u>must</u> click on the **Yes** button when prompted: "Do you wish to update the Mk9 with the current screen parameters first?" If you do not, your new parameters will not be copied to the Mk9!
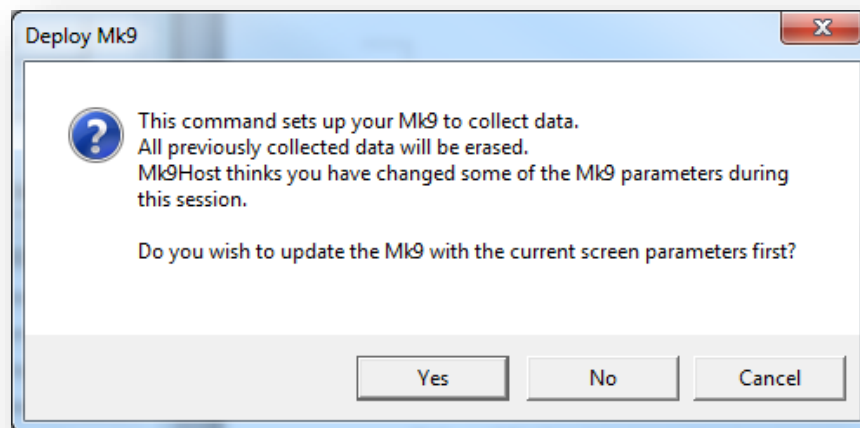
- If you have not changed any parameters and Mk9Host concurs with this, the following dialog box will appear. *NOTE: All previously collected data will be erased when you click **OK**.*
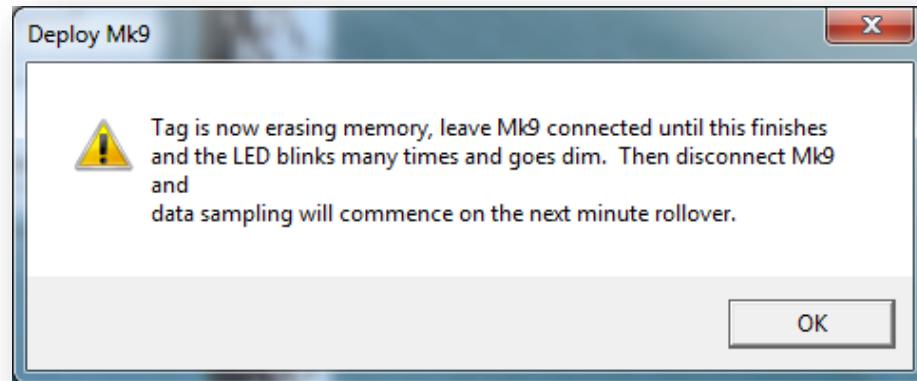
The information contained in these documents is confidential, privileged and only for the information of the intended recipient and may not be used, published or redistributed without the prior written consent of Wildlife Computers.

- You will be instructed to disconnect the Mk9.

- The LED will flash quickly 10 times, followed by one long flash. It will then glow dimly until the next full minute.

- The LED then flashes at the wake-up interval until one of the next two conditions occur:

  o 31 hours pass, after which the LED no longer flashes.

  o The depth sensor reads a change of greater than 20m, after which the LED no longer flashes.

b) *To standby and preserve old data:* If you don't want to deploy the Mk9 right away, you must suspend its operation clicking on the **Standby** button.

- If you have made changes to any parameters that you wish to save, you must click on the **Yes** button when prompted: "Do you wish to update the Mk9 with the current screen parameters first?"
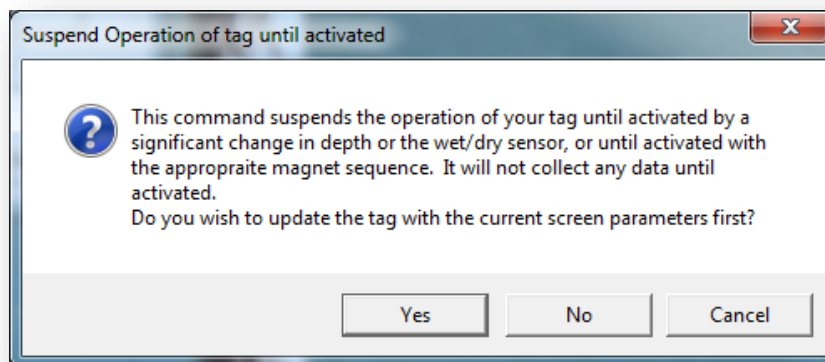
- If you made no changes to any parameters, or do not wish to save the changes you made, then click on the **No** button when prompted: "Do you wish to update the Mk9 with the current screen parameters first?"

- If you have not changed any parameters and Mk9Host concurs with this, the following dialog box will appear. You can choose to either erase the collected data or leave it on the tag.
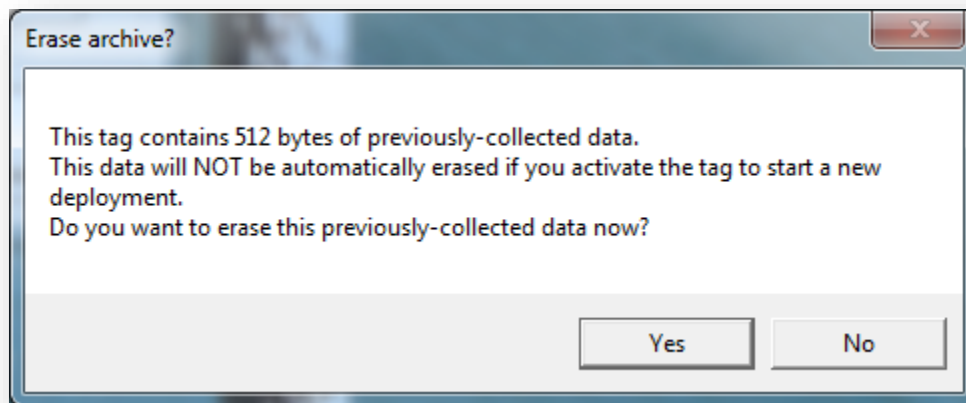
- You will be instructed to disconnect the Mk9.
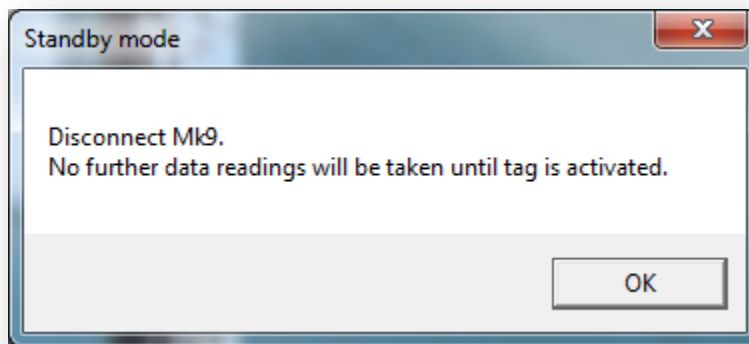
- The LED will quickly double-flash twice, followed by one long flash. It ceases flashing after this, and the Mk9 tag is in standby mode.

Shutdown the Mk9

Use this mode for storage between deployments. You must re-establish communications to deploy the tag or put it into Standby mode. The clock is maintained. The data in memory are maintained.

WARNING: You should never exit Host or disconnect a Mk9 without putting the tag in Deploy, Standby, or Shutdown mode. Doing so could leave your Mk9 in a mode that will use up its internal battery within a few hours.

Activating the Mk9 (Start Sampling)

When you exit communications from the Mk9 using the Standby button, it can be activated (start sampling) without establishing communications in one of three ways:

- Applying a magnet in a special pattern

    o Pass a magnet over the reed switch. The LED will quickly double-flash twice, followed by one long flash, indicating it is in standby mode.

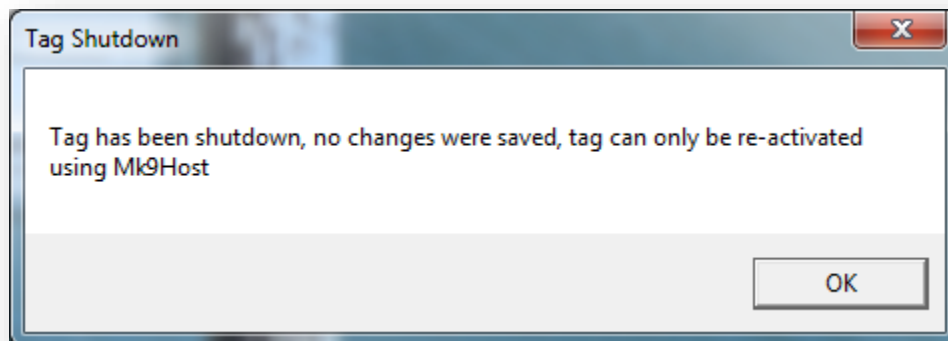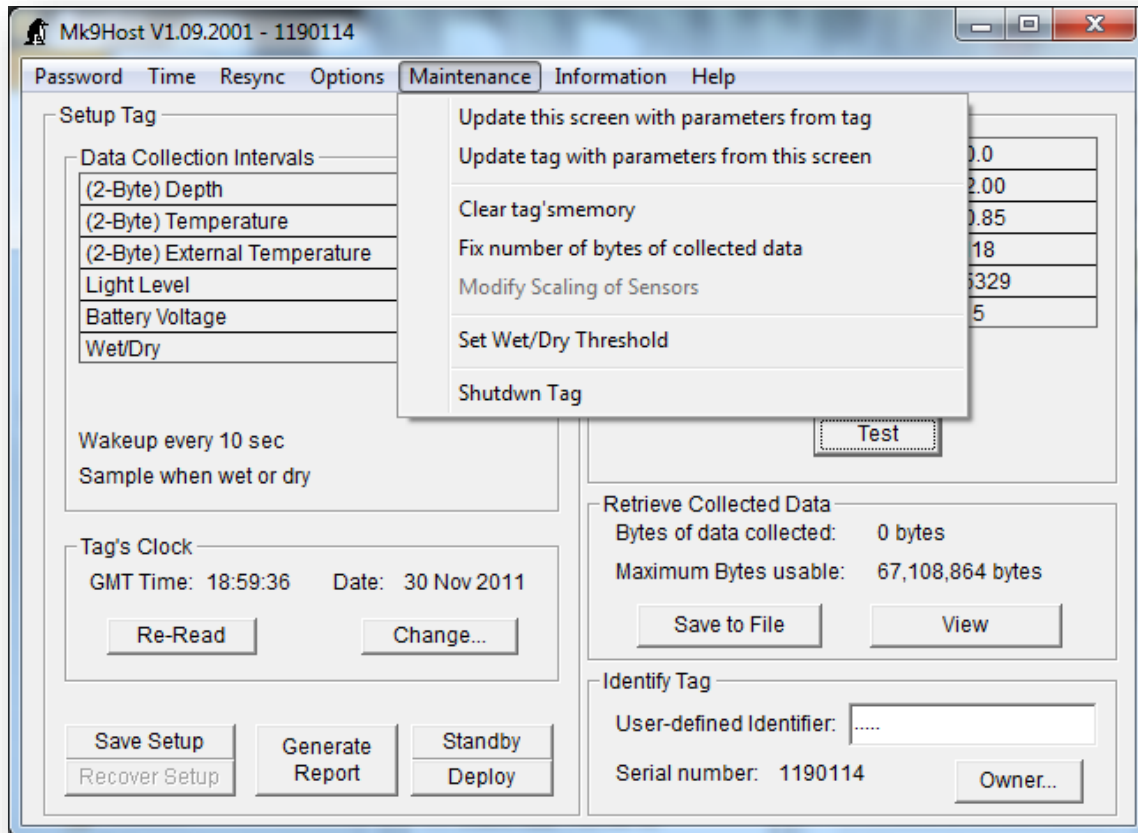   o If you pass a magnet over the reset switch during the long LED flash, the Mk9 will go into Deploy mode. The LED will flash quickly 10 times, followed by one long flash. It will then glow dimly until the next full minute, indicating it is deployed.

    o If you do not pass a magnet during this long LED flash, the Mk9 remains in standby mode.

- Depth sensor reads a 20m change in depth.
- Wet/dry sensor senses a pre-set minimum change in conductivity.

Verifying Function Prior to Deployment

You should always confirm the Mk9 is sampling before deployment. Pass a magnet over the reed switch. The LED will flash quickly 10 times, followed by one long flash. It will then glow dimly until the next full minute indicating it is sampling.

Sealing the Communications Port

The communications port is where the Wildlife Computers Communications Cable connects to the tag. Prior to a deployment, this port should be sealed with the plug provided. Smear a small amount of the silicone grease supplied onto the sides and bottom of the plug, align the plug and pins, and carefully push the plug into the port. If it does not align easily with the pins, rotate it 180 ° and try again. The plug prevents corrosion of the pins during the deployment; however, the plug is not required for the tag to function normally.

Setting up Multiple Tags

If you have many Mk9s to set up identically, clicking on the **Save Setup** and **Recover Setup** can speed up the process. Set up the first tag, update it, and click on **Save Setup** before Deploying. Then on successive tags, repeat the same setup by clicking on the **Recover Setup** button.

Additional Deployment Information

Wildlife Computers recommends that all tags initially be set up in the lab when there is plenty of time and conditions are at their best. Once the tags are set up, they can be suspended until ready to use. Just prior to deployment, the user can deploy them using a magnet.

NOTE: Be sure that all previous data are erased prior to redeploying if you want the entire Mk9 memory available for data collection.

Alternatively, since Mk9 batteries have plenty of capacity. If the tags will be deployed within a month, they can be set up and deployed at the same time. The user should then use a magnet to verify the Mk9 is sampling before deploying it on the study animal or gear.

Understanding Mk9 LED Flashes

The pattern of LED flashing is "smart," giving you information on the status of the Mk9.

Normal State (Steady On)

Normal state when communications are idle between Mk9Host and the Mk9. The tag thinks it is connected to the USB communications cable. It is waiting for a new command from Mk9Host. If steady on and the tag is NOT connected to a communications interface, the tag battery will be quickly drained. Reset IMMEDIATELY, using the magnet. Note, however, that the LED goes off when testing the sensors.

Communication in Progress *(Slow flash, approximately 2 seconds on followed by two seconds off)*

The tag thinks it is connected to the USB communications cable, and is waiting for the rest of a command to be received from Mk9Host. If it does not receive the next character of the command within 60 seconds, the tag automatically resets itself. This condition probably indicates characters have been dropped when communicating with Mk9Host. If you see this LED pattern, you can reset with the magnet, and then use the Resync menu item to resynchronize Mk9Host with the Mk9.

Tag is Set to Start Data Collection *(LED will flash quickly 10 times, followed by one long flash. It will then glow dimly until the next full minute)*

The tag has just been deployed and is waiting for the beginning of the next minute to begin recording data. You will also see this pattern if a magnet is used to reset the Mk9 when it is deployed.

Data Collection State *(Short flashes corresponding to the wakeup interval)*

When the tag is first deployed, it emits a short flash whenever it wakes up to see what samples are necessary. The flash corresponds to the "Wake up every XXX seconds" display in Mk9Host. This flashing will automatically stop after 31 hours, or if the pressure transducer is depressed (all previous versions). This follows the "Tag is Set to Start Data Collection" LED pattern.

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⚠️ ***If you DO NOT see this Data Collection State flash pattern, do NOT deploy your tag. It is NOT sampling data.***

Validate Internal Parameters *(Rapid flash)*
If the tag was previously deployed and you just reset it, the tag is searching its internal flash memory to validate internal parameters. If all goes well, you will not see this. It MAY occur during a reboot. If you see this pattern, do not panic. The tag is taking care of itself.

Data Exchange Mode *(Uneven "random" flashes)*
If you are connected to the tag with a computer and are executing the Mk9Host program, the LED generally flashes every time the Mk9 exchanges data with the Mk9Host program. This flashing will depend on what operations you are performing with the Mk9Host program.

Unrecoverable Error *(rapid flashes for about 2 seconds)*
The tag is telling you it has encountered an unrecoverable error and is no longer recording data. The tag will emit this pattern for approximately 10 seconds. The LED will then extinguish, and the tag will enter Deep Kill mode.

⚠️ ***You CANNOT deploy the tag at this point. Contact Wildlife Computers for further instructions.***

Shut Down Mode
The LED will not flash when the magnet is passed over the reset position.

⚠️ ***You CANNOT deploy the tag at this point without communicating with the tag and putting it in deploy or standby mode.***

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Data Retrieval

Basic Recovery Information

CAUTION: ***Do not make any changes to the Data Collection Intervals or Duty Cycling until you have recovered (saved to a file on your PC) your collected data.***

If the Mk9 has been out for a long deployment (months to years), it is possible that contamination of the communications port may cause some communication difficulties. The following instructions, in addition to describing how to recover the data, explain possible problems that might occur during the recovery and how to fix them. Even if all attempts to communicate with the Mk9 fail, your deployment data are probably still in memory, and can be retrieved by Wildlife Computers.

Preparation for Post-Deployment Communication

When you recover your Mk9 full of valuable deployment data, there are several steps to perform before attempting to connect it.

As a precaution, it is advised to have the following on hand:

- Compressed air in a can
- Electronic contact cleaner, if available
- A spare gray ribbon cable, if available

1. Thoroughly dry the Mk9 with a paper towel.
2. Remove the communications port protection plug.
3. Blow any water out of the communication port. Make sure the port is clean and dry. Compressed air in a can works well for this. Note that communication with a Mk9 with saltwater in the communications port will cause the pins to corrode very fast!
4. Count the number of pins in the communications port. If there are not four pins, one or more have corroded or broken off. Send the Mk9 to Wildlife Computers and we will download your data.
5. Examine the pins in the communications port. If they are rusty or corroded, send the Mk9 back to Wildlife Computers for downloading.
6. If all four pins look clean and golden, you can continue and attempt to establish communications.
7. You may wish to spray some contact cleaner into the communications port as a precaution.

Communicating with the Mk9 and Downloading Data

1. Start Mk9Host.
2. Initiate communications with the Mk9 as before. If you cannot successfully connect to the Mk9, follow the directions in the Other Advice section below.
3. Logon as Owner, using your password.
4. Note the bytes of data collected in the Retrieve Collected Data box. If the value displayed does not seem reasonable, the number of bytes collected needs to be re-determined: Select the Maintenance… Fix number of bytes of collected data menu item.
5. Note the time of the Mk9 Clock. It should read GMT time. Note if there are any discrepancies. You will need this information if you plan to use our geolocation software.
    a. Note the parameters in the Data Collection Intervals box. They should be the same as when you initially deployed the instrument.
6. Print a hardware configuration report. This logs the Mk9's parameters.
7. Test the sensors. Verify all the sensors still work.
8. Save the collected data to a file on your PC.
    a. Click on the **Save to file** button and follow the instructions.
    b. The saved file is a hex representation of the control parameters and collected data.
    c. Use Wildlife Computers programs to decode the .wch files.
9. View the data (for small datasets ONLY)
    a. Click on the **View** button in the Retrieve Collected Data box. You can select the number of bytes of data to view. Selecting more than about 30,000 bytes may tax your patience. Viewing gets progressively slower with bigger files.
    b. You can change how the data are delimited by selecting a new list separator under the options menu.
    c. You must save the data by clicking on the **Save to File** button rather than the through the "log view to file" method in order to use any of Wildlife Computers' analysis programs.
10. Exit communications by shutting down through the Maintenance menu.

Storing Mk9s

Lithium batteries develop an oxide layer over their anodes to minimize self-discharging. This is called passivation. This process is exacerbated by high (30°C+) temperatures. The passivation layer is "burned off" when current is drawn from the battery. Very little current is drawn from the Mk9 when it is suspended, so a passivation layer can form.

If the passivation layer is too thick, the battery voltage drops so low that the Mk9 cannot function.

Mk9s that will not be deployed for an extended period of time (more than one month) should be shut down and stored in a refrigerator or freezer (5° to -20°C). This minimizes the battery passivation.

The Mk9 should be tested after storage, prior to deployment. It is not necessary to warm up the tag prior to proceeding with the test.

Establish communications with the tag. Test the sensors and check the battery voltage. It should read 3.0V or greater. The battery voltage may be a little low initially but should increase after testing the sensors for a few minutes. Set the Mk9 to sample overnight at a one-minute data collection interval, deploy and activate. Leave the Mk9 in a freezer (-10C) overnight. Download the data and verify the Mk9 collected data throughout the test.

Technical Specifications

Below are the general physical specifications of TDR-Mk9 tags.

Attachment type	Surgically-implanted or externally mounted***
Sensors	Depth, Temperature and Light-level ***
Depth sensor range	0-200 m, 0-1700 m, 0-2000 m ***
Depth sensor resolution	0.5 m
Depth sensor accuracy	+/- 1% of reading
Temperature sensor range	-40 to 60° C
Temperature sensor resolution	0.05° C
Temperature sensor accuracy	+/- 0.1° C
Light sensor (when installed)	$5 \times 10^{-12} W.cm^{-2}$ to $5 \times 10^{-2} W.cm^{-2}$
Wet/dry sensor	***
Length (mm)	***
Width (mm)	***
Height (mm)	***
Weight (g)	***
Pressure rating (m)	***
Operating temperature rating (℃)	-20 to 50℃
Conductivity operational limits	0.1 to 5 S/m
Recommended storage temperature range (°C)	5 to -20℃
Memory	64 MB
Maximum deployment length	Over eight years based on sampling depth, body temperature, external temperature and light every 30 seconds. Maximum deployment length is limited by memory thus depends upon the user-programmed sampling rates.

*** indicates the specification is dependent upon the configuration model

Other Advice

1. Once a Mk9 is deployed, keep all magnets away from the reset position. Even though it is difficult to suspend or deploy the Mk9 by simply swiping a magnet over the reset position, it still is a good idea to keep magnets away.

2. Do not cover the following components with paint or epoxy.

   a. Light sensor (pink square).

   b. Pressure transducer.

   c. Wet/dry sensors (metal discs).

3. Make sure the wet/dry sensors are clean and free of any grease or silicone. You may use fine grit sandpaper to ensure the discs are clean.

4. If you lose the communications port plug in the field, you can fill the Comm port with silicone grease, then seal the port with epoxy. The epoxy can be chipped away upon recovery.

5. If you will be traveling on a commercial carrier with your Mk9 tags

   a. We recommend that you have them in Shutdown or Standby mode so that they can be safely packed in your checked baggage.

   b. We recommend that the user always take a laptop or other computer to the field location, even if the tags have been set up in advance, so that communication with the tag is possible on site if necessary.

   c. We strongly recommend that the user ALWAYS re-verify that the tag is still in the proper mode following travel to the field site.

6. If you have difficulty establishing communications:

   a. Confirm that the communications pins are clean.

   b. Uninstall Host and the USB Driver. Unplug the USB communications cable. Reinstall the USB Driver first, then reinstall Host. Plug in the USB communications cable BEFORE you open Host.

   c. If a and b do not help, try using a backup USB communications cable.

7. Mk9Host "crashes" or "hangs" while communicating

   a. If this happens, the Mk9 may be left in an unstable state. Disconnect the Mk9. Reset the Mk9.

   b. Reboot your computer (if necessary) and restart Mk9Host.

   c. Click on the OK button at the Welcome screen.

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d. Reconnect the Mk9.

e. Pass a magnet over the reset area on the Mk9 and click on the Connect button at the Connection screen. The connection may fail. If so, reset again and click on the Retry button. You may even need to choose the Reset button before a connection is made.

f. Once the connection is successful, Logon as Owner.

g. Exit communications with the Mk9 by clicking on the Suspend or Deploy button.

8. "Mk9 is out-of-sync with host program" message

a. You get the message "Mk9 is out-of-sync with host program" while running the Mk9Host program. This occurs when communications is interrupted (for example, the communications connector is bumped).

b. Click on the OK button.

c. Click the Resync menu item.

d. This resynchronizes the Mk9Host with the Mk9 processor. You will then get either the message "Mk9 Resynchronized," or the Logon screen.

9. Software is missing or will not install

a. You can download the current version of the software you need from wildlifecomputers.com

b. Choose the Downloads button and take note of the instructions.

c. Select the appropriate Mk9 program (or document).

d. If you do not have Internet access or you are unable to find what you need on the web site, please contact us for further assistance.

Contacting Wildlife Computers

U.S. and International

Members of the Wildlife Computers technical sales and support team are located in Redmond, WA, USA, and Havelock North, New Zealand, allowing us to cover promptly a wide range of time zones.

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For Asian Clients

While we welcome your direct correspondence, we recommend that you contact our colleague, Yong Huang, for assistance. Mr. Huang understands the special purchase processes for your countries and will provide you with the best service for the best price. He also is fluent in Japanese, Chinese, and English.

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