



G2110E2 and G5 Series GPS/Iridium Collars User Manual

**Models G2110E2, G5-2A, G5-D, G5-2D
Including *Neolink***

IMPORTANT: The G2110E2 and G5 Series GPS/Iridium collars are not initially programmed for operation. They must be programmed prior to deployment.

The Iridium data service on the G2110E2 and G5 Series GPS/Iridium collars is not initially active. Please contact ATS to activate.

NOTE: G5 series collars ARE NOT refurbishable. Do not return collars for refurbishment service or disposal.

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Section 1 Introduction

Thank you for purchasing an ATS Iridium/GPS Collar.

The ATS Iridium/GPS Collar acquires GPS fixes and stores the fix data in onboard memory for download upon retrieval. It also attempts to transmit the data via the Iridium satellite network so the user can view GPS data while it is deployed. Both the GPS acquisition schedule and satellite transmission schedule are user programmable. The collar will also store and transmit an ambient temperature reading, activity level, and GPS statistics with each successful GPS dataset.

The software to program the collar is called *ATSFixes* for Satellite Collars, and it can be downloaded from www.atstrack.com.

The magnet attached to the collar at the location of two white dots keeps it running at a lower power. When not using your collar, leave the magnet attached here.

Data service HAS NOT BEEN activated for ATS Iridium/GPS collars. Please contact ATS for activation of collars.

Section 2 Theory of Operation

The ATS Iridium/GPS Collar consist of the following different assemblies:

1) the collar belting, or attachment mechanism, 2) an electronics assembly which is attached to the collar belting, 3) various antennas for VHF, GPS and Iridium systems, 4) a battery supply.

The electronics housing consists of a VHF transmitter, like those found on traditional VHF beacon collars, a GPS receiver chipset, and an Iridium satellite modem. Each has its own antenna, as noted above.

The collar has a magnetic on/off switch indicated by two dots. When a magnet is placed at or near this location, the VHF, GPS, and satellite transmissions are disabled so that the collar stays in its lowest power state.

The collar stores all location data in the flash memory of the collar's electronics. Location data is sent periodically to the Iridium satellite system according to the schedule selected for the collar. The data is then down-linked automatically to the Iridium's ground based reception and processing center, thence sent via the web to ATS's Hosting Computer. After the data is processed, it is automatically uploaded to the ATS Iridium web database. The data may also be retrieved by PC via the *Wildlink* module if the collar is recovered.

The VHF transmitter is used to locate the animal in order to retrieve the collar.

Section 3 Programming a collar via ATSFixes

The ATS Iridium//GPS Collar requires use of ATSFixes for Satellite Collars and the PC/GPS *Wildlink* W100 communication module, PN 17621 (see Figure 1) in order to program the collar.



Figure 1. ATS PC/GPS *Wildlink* W100 communication module, PN 17621 (with USB cable)

A software installation package for ATSFixes for Satellite Collars can be downloaded from <https://atstrack.com/customer-support/software.html>. The software package will also contain the necessary driver requirements for the *Wildlink* module. Please download and unzip the software package based most accurately on the collar serial number to be programmed before programming the collar. Also, do not plug in the *Wildlink* module into your PC USB port until after the driver is successfully installed.

Installing ATSFixes for Satellite Collars Software

To install ATSFixes for Satellite Collars, double click on the setup.exe file located in the installation package. The software will be installed on your computer, and you can find it later under the programs list on your computer.

The installation for the ATSFixes for Satellite Collars software will create some folders on the C: (hard) drive of your computer.

Wildlink Module Setup

Administrative rights are required to install the Wildlink driver. To install the driver, double click on the executable that pertains to your PC's operating system and bit size (path as indicated):

- CP210xVCPInstaller_x64.exe (Windows 10; 64-bit;
\CP210x_Universal_Windows_Driver\CP210x_Windows_Drivers)
- CP210xVCPInstaller_x86.exe (Windows 10; 32-bit;
\CP210x_Universal_Windows_Driver\CP210x_Windows_Drivers)
- CP210xVCPInstaller_x64.exe (Windows XP, 7, 8; 64-bit; \W100 Driver Windows
XP_7_8_8.1\CP210x_VCP_Windows)
- CP210xVCPInstaller_x86.exe (Windows 10; 32-bit; \W100 Driver Windows
XP_7_8_8.1\CP210x_VCP_Windows)

Follow the instructions on the screen to install the driver.

Programming a Collar

The collar program you create for the collar controls the GPS fix schedule, VHF transmitter operation, and satellite transmission schedule. All settings are the same for each year i.e. different years cannot have unique program schedules.

Life Estimation

The *ATSFixes* for Satellite Collars Programming Software estimates the life that you can expect from your collar. If you need more life from your collar than what is estimated, you can go back and adjust your schedule accordingly. Maximum GPS on time, VHF duty cycle, GPS acquisition rate, and satellite transmission rate will all affect life.

Note: Calculations for life estimates assume that the batteries are new.

Steps to Start Collar Programming

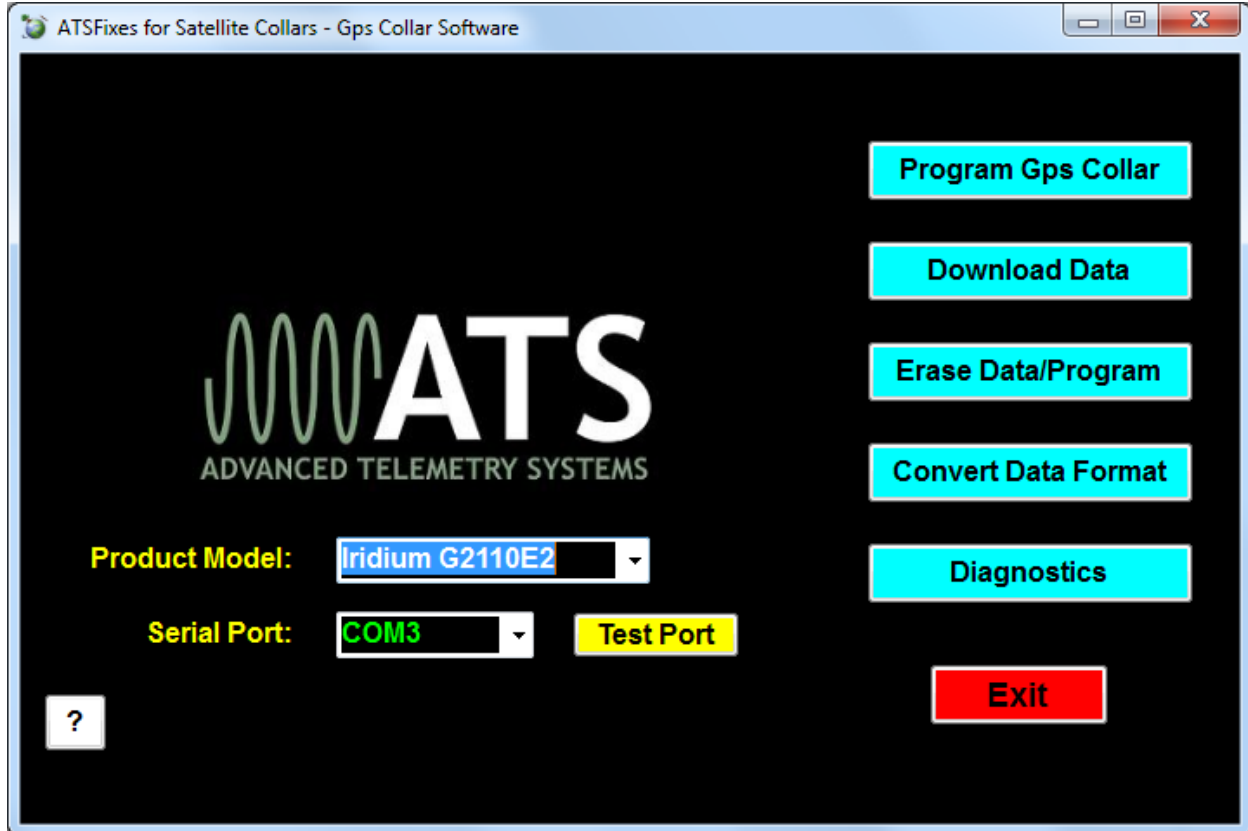


Figure 2. ATSFixes for Satellite Collars – Main Page

To upload a program into the collar, the *Wildlink* module needs to be connected to the USB port on the PC running the ATSFixes for Satellite Collars software. **Connect the *Wildlink* prior to starting ATSFixes** and allow the PC time to detect the *Wildlink* if necessary. Also, the collar needs to be in range of the *Wildlink* module (about 200 mm) to successfully upload a fix schedule. Note: Remove the collar magnet prior to programming.

1. Open the ATSFixes for Satellite Collars Software. It should look similar to Figure 2. The software recognizes all available serial ports available when starting.
2. From the Product Model listing, select the model that you are using.
3. For the Serial Port option, select the COM port associated with the *Wildlink* module. A guess and check method may be used to determine the correct COM port to use or Windows' Device Manager tool can be used to determine which COM port should be selected - the *Wildlink* module will be associated with the port that shows up as 'Silicon Labs CP210x' as its name. If the *Wildlink* module was not connected to the PC before ATSFixes was started, the correct COM port will not show up. Be sure to connect the *Wildlink* module before starting ATSFixes.
4. Click on the "Program GPS Collar" button to start creating a program for the collar.

- After clicking “Program GPS Collar,” the following page will appear (see Figure 3). Select options for each programming section. Each section has a help button [?] that goes over further details related to the section. Click Next when finished with the page.

Programming GPS Collar: Step 1 - Study Area, VHF Transmitter, and Satellite Transmission

Study Area Terrain

- Open Field or Low Brush (60 sec) Fix times depend on the collar having line of sight with the satellites and time between fixes.
- Forest (120 sec) Expect longer gps fix times (resulting in shorter life) for study areas with heavy canopy. Expect shorter gps fix times (resulting in longer life) for study areas that are open.
- Heavy Canopy (180 sec)

Satellite Transmission Interval

- 4 hour (00, 04, 08, 12, 16 GMT)
- 6 hour (00, 06, 12, 18 GMT)
- 8 hour (00, 08, 16 GMT)
- 12 hour (00, 12 GMT)
- 24 hour (00 GMT every day)
- 48 hour (00 GMT every 2 days)
- 72 hour (00 GMT every 3 days)
- 96 hour (00 GMT every 4 days)
- 120 hour (00 GMT every 5 days)
- 144 hour (00 GMT every 6 days)
- 168 hour (00 GMT every 7 days)

The Collar will transmit fixes to the satellite at this interval, regardless of the number of successful fixes accumulated.

If the Collar accumulates 22 successful fixes, it will transmit them to the satellite immediately.

VHF Transmitter

- On 24 Hours/Day Time On: GMT Time Off: GMT Make certain VHF is on during all hours when you will be searching for animals. Minimum 1 hour per day.
- Activate Mortality

Iridium G5-2D
New Collar Program
Previous
Next

Figure 3. Programming GPS Collar: Step 1

- Next, the Fix Schedule, Options, Estimated Life window will appear (see Figure 4). This page contains the GPS fix schedule options. It also contains the enable options for the *Neolink* system (see Section 12, 13 and 14 for more details) and the Geofencing system (see section 15). Lastly, a life estimate is available to provide an estimate of collar life.

Fix Schedule, Options, Estimated Life: Step 2

Fix Schedules

Beginning Julian Day: Note: If this is the only schedule entered, it will be used for ALL days.

First fix of the day at GMT. Last fix at GMT. Fix interval is

Beginning Julian Day: May

First fix of the day at GMT. Last fix at GMT. Fix interval is

Beginning Julian Day: May

First fix of the day at GMT. Last fix at GMT. Fix interval is

Options

- None
- Vit / Fawn Events
- Use Geofencing

Estimated Life

Typical Case: Days

Worst Case: Days

Cancel
Program Collar

Figure 4. Fix Schedule, Options, Estimated Life.

Select appropriate options for each option section and click on the Program Collar button. Then touch the magnet to the collar where the magnet stays during off mode and remove the magnet. If done correctly, the PC will begin uploading a schedule to the collar.

7. When *ATSFixes* is done uploading the program, a message will display on the PC's screen. If it is a success message, programming is complete. If it is an error message, repeat programming.

Once *ATSFixes* successfully programs a collar, a configuration file is created and added to the folders. The file contains all the information for the program that was uploaded to the collar, including the serial number of the collar. This file is stored in the C:/Advanced Telemetry Systems, Inc./GPS/GPS_COLLAR_PROGRAMS folder.

Reprogramming a Collar

If a collar needs to be reprogrammed, it will need to be first be erased. Use the Erase Data/Program button to erase the collar's program and data before reprogramming it. **Be sure that you have first downloaded any stored data you wish to keep.**

If there is any concern whether or not a collar is programmed, *ATSFixes*' Diagnostic test can be used to determine if a collar is programmed or not. See section 10 Diagnostics for details.

Section 4 Collar Functionality

VHF Beacon Beep Patterns

The collar includes a VHF transmitter that can be used to locate the collar. The VHF transmitter can be scheduled to run continuously or only during a certain period of hours each day. There are different beep patterns for the VHF and it can beep at 48 pulses per minute (ppm), 30 ppm, or 80 ppm. Some beep patterns have single, double and/or triple pulses. The VHF transmitter will not operate while the collar is loading a program, obtaining GPS a GPS fixes or uploading data.

The VHF transmitter can be programmed to stay off for up to 23 hours each day in order to extend the collar's life. The VHF transmitter beep patterns are the following.

The different operating modes of the collar and the associated VHF patterns are as follows:

Normal operation (with unsuccessful last fix) = 48 ppm single, duty cycle applies

Normal operation (with successful last fix) = 48 ppm single with double every 6th, duty cycle applies

Mortality mode with slow rate enabled = 30 ppm, duty cycle override

Mortality mode with fast rate enabled = 80 ppm, duty cycle override

Collar released successfully = Mortality VHF, if enabled. If mortality is not enabled, 30 ppm. Duty cycle override.

Low Battery = Mortality VHF, if enabled. If mortality not enabled, 30 ppm. Duty cycle override.

After erasing program and data = no VHF for 24 hours, after 24 hours 30 ppm.

After removing magnet = After a silent period of up to 30 seconds, VHF pattern will be pattern that was emitted prior to magnet going on to the collar

VIT not synced or a Birth has been detected (if applicable) – triple pulse within a 10 second period.

GPS Operation

During a GPS fix attempt, the VHF transmitter will be silent. A GPS attempt may last as long as the setting that was selected during programming but may also be shorter depending on the collar's view of the sky. Whether the fix attempt was successful or not is indicated by the VHF beep pattern that follows the attempt. *You will only hear these beep patterns if the VHF transmitter was scheduled to beep during this time.*

Satellite Transmission Operation

During a satellite data transmission attempt, the VHF transmitter will be silent for up to 30 seconds. If the transmission is successful, data will be transmitted to the ATS server for processing. If the transmission is not successful, the collar will attempt another transmission in twelve to twenty-four minutes (provided that the transmission attempt does not conflict with a GPS fix attempt). If the collar fails to transmit data for ten consecutive attempts, the collar will enter **Satellite Transmission Suppression** (see Section 9 Satellite Transmission Suppression for more details).

Remote Commands

The GPS fix schedule of the collar can be adjusted remotely via satellite to a regular interval. Available intervals are (in minutes): 10, 20, 30, 90, 120, 360, 480, 720, and 1440. The schedule can also be adjusted from these intervals back to the original schedule. Note: Adjusting the fix schedule may interfere with the programmed frequency of the satellite transmissions and calculated battery life.

The GPS fix attempt duration can be adjusted remotely via satellite to one of three options: 60, 120 or 180 seconds.

The mortality setting of the collar can be adjusted remotely. Available settings are 4, 6, 8, 10, or 12 hours and mortality disabled. The satellite transmission schedule can be changed remotely. Available intervals are every 4, 6, 8, 12, 24, 48, 72, 96, 120, 144, or 168 hours.

The VHF duty cycle can be remotely changed for any start time and any duration from 1 to 24 hours.

For all remote requests, the changes take place after the next satellite transmission, not when the remote command is issued. See Section 8 Remote Commands for more details regarding remote programming.

Mortality

If a collar is programmed with mortality, it will go into mortality mode if the collar does not detect activity for the prescribed mortality time. In mortality mode, the collar will initiate a transmission sequence to alert the user about the mortality. If the mortality transmission is successful, you will receive an email alert to let you know that the collar is in mortality. In addition to transmitting a mortality alert, the collar will also emit a mortality VHF. The mortality VHF overrides a duty cycle if one has been set up.

In the event of a false mortality, the collar may get out of mortality before a successful transmission takes place. The satellite transmission will still be attempted until ten attempts are reached and if successful, may indicate mortality was *not* reached. Also, if the satellite antennas do not have an adequate view of the sky due to a true mortality, no transmission may get through.

In order for the collar to exit mortality mode, it must undergo five seconds of activity. (The five seconds of activity does not have to be consecutive but should be within the mortality period chosen.)

Neolink* Events *(G2110E2 and G5-2D Collar ONLY)

If a collar is programmed with the *Neolink* option, it will regularly attempt to detect the presence of a *Neolink* device such as the M3930U (VIT) or the M4230U (expandable fawn collar). If certain conditions are met for the *Neolink* devices, the collar will transmit an alarm to the user to signify the event. See Sections 12, 13, and 14 for more details. If the *Neolink* system is not necessary, it should not be enabled in order to save battery life.

Geofencing System

If your G5 Series collar is programmed with Geofencing capability, it will transmit alerts when it determines that it has entered/exited specific areas. See Section 15 for more details.

Section 5 Attaching the Collar

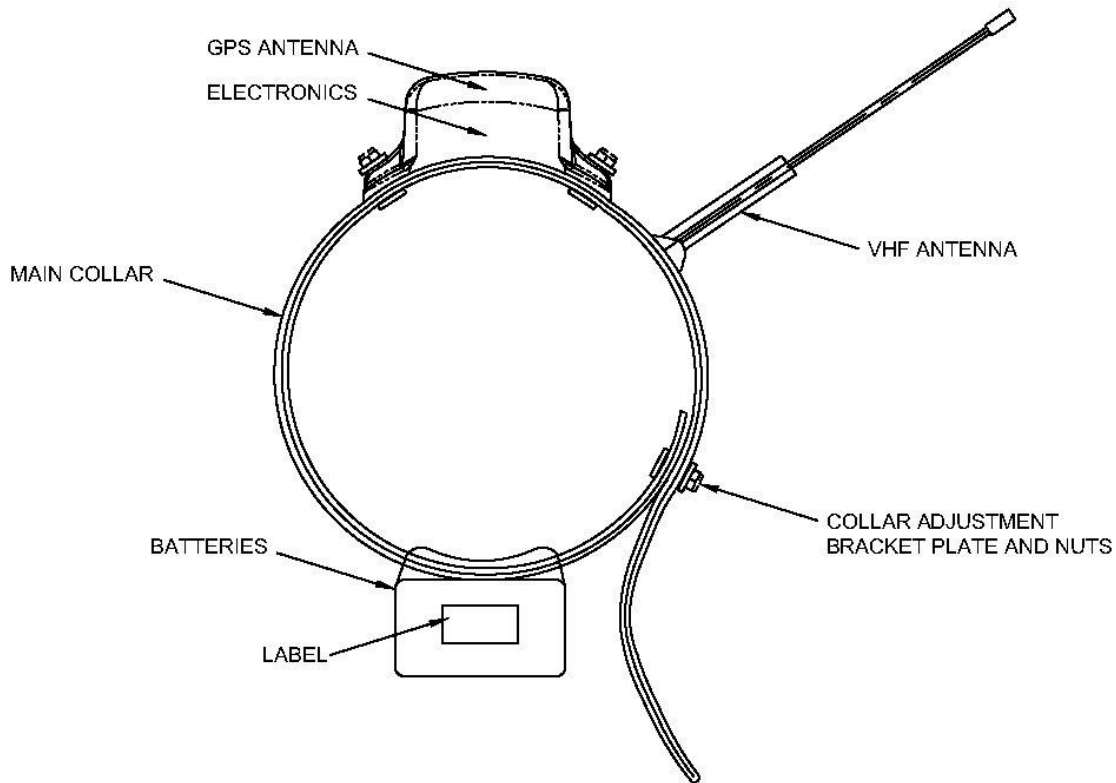


Figure 5. Collar attachment (G5 Series)

Your collar has been optimized according to the collar dimensions specified during ordering. The size of the collar is determined by the collar adjustment bracket and the main collar holes (see Figure 5). To adjust the collar and/or attach the collar to an animal, the procedure is as follows (some differences may exist between models):

1. First remove the collar adjustment bracket nuts and plate from the collar adjustment bracket and remove the collar adjustment bracket from the main collar.
2. Wrap the collar around the animal's neck so that the extra length (if any) of the main collar hangs from the collar (as shown in Figure 5). The extra length may also be tucked inside the collar as well and may even be cut if desired (but only for external VHF antenna collars).

3. Observe where the nearest set of holes on the VHF antenna end of the main collar line up with the holes on the battery end of the main collar such as to maintain a desired tension level on the animal's neck.
4. Place the collar adjustment bracket through both sets of holes and through the brass fastener plate and tighten using nuts and the provided nut driver. Do not over-tighten as this may damage the collar adjustment bracket.

Section 6 Downloading Data from the Collar

Once GPS position data has been stored in the collar's memory, e.g. after testing or field retrieval, it can be downloaded to your computer. Data is grouped into two categories: Fix Data and Event Data. All models have Fix Data. This is the GPS data that the collar acquires. The other data is Event Data. Only collars used for *Neolink* or Geofencing have data in this category. You may only download one group of data at a time.

Steps for Downloading Data

1. Connect the *ATS Wildlink* module to a USB port on the PC.
2. Open the *ATSFixes* for Satellite Collars Programming Software.
3. Select the appropriate Product Model.
4. Select the appropriate COM port. See Section 3 to determine the correct COM port, if necessary.
5. Click the Download Data button.
6. Choose between the 'Fix Data' or 'Event Data' data option.
7. Choose between Degrees, Decimal Minutes or Decimal Degrees for the data format option.
8. Select time zone desired for the downloaded data in the scroll down option list.
9. Click the Continue button.
10. Touch a magnet to the collar's on/off position to initiate communication.
11. Wait for download to complete.

After Downloading Data

Data files downloaded from the collar are stored on your computer in the C:/Advanced Telemetry Systems, Inc/GPS/ folder. The filename is Dxxxxxx_JJHHmmGMT-gg.txt where xxxxxx is the serial number of the collar, JJJ is the Julian date the data was downloaded, HHmm

is the hour and minutes when the data was downloaded on the PC, and gg is the GMToffset applied to the data. For instance, D030086_3131134GMT-05.txt represents a data file for collar with SN 030086. The date and time of download was on the 313th day of the year at 11:34 local computer time and a GMT offset of -5 was applied to the data set.

Data Block Formats

Degrees, Decimal Minutes ddm. mmmm, N/S, dddmm. mmm, E/W (d = deg, m = min)

Yr	Day	Hr	Mn	St	Act	T	Blk	Lat	N/S	Long	E/W
aa	bbb	cc	dd	e	ff	gg	hhhhh	ii.iiiiii	j	Kkk.kkkkkk	l
09	001	10	21	2	00	30	00001	17.437810	S	063.098980	W

Cont:

Hdop	#Sat	#sec	Dim
mm.m	nn	ooo	p
11.9	3	23	2

Decimal Degrees +/-dd. dddddd, +/-ddd. dddddd (d = degrees)

Yr	Day	Hr	Mn	St	Act	T	Blk	Lat	Long
aa	bbb	cc	dd	e	ff	gg	hhhhh	+/-ii.iiiiii	+/-kkk.kkkkkk
09	001	10	21	2	00	30	00001	-17.72968	-63.16497

Cont.:

Hdop	#Sat	#sec	Dim
mm.m	nn	ooo	p
11.9	3	23	2

Where:

aa = Year

bbb = Julian day (001-365, or 366 for leap year)

cc = Hour (00-23)

dd = Minute (00-59)

e = GPS fix status (0 = will never be logged, 1 = attempted but timed out, 2 = attempted and successful, 3 = next fix that will be taken, 4 = fix not taken, collar in low batt)

ff = Activity (00-99%). The activity value indicates the percentage of seconds between the previous fix until the current fix that the collar detected significant movement during the period. Every second the collar examines an onboard accelerometer to see if the accelerometer detected movement that exceeds a specific threshold. If the accelerometer detected enough movement during that second, the second in question increases the

activity percentage. For example, if the period between GPS fix acquisitions is 1 hour and there were 360 seconds where activity was registered, the activity value would be 10%.

gg = Temperature (degrees Celsius)

hhhh =Block Number of Data Stored (00000-16381)

iii.iii = Latitude (DDmm.mmmm, Degrees, minutes, decimal minutes) or (+/-dd.ddddd, Decimal degrees)

j = Direction of Latitude (N or S)

kkkk.kkkk = Longitude (DDmm.mmmm, Degrees, minutes, decimal minutes) or (+/-ddd.ddddd, Decimal degrees)

l = Direction of Longitude (E or W)

mm.m = HDop

nn = Number of satellites used in achieving GPS fix

ooo =Number of seconds needed to achieve GPS fix

p = Dimension of GPS fix (2 or 3)

Section 7 Receiving Data from the Deployed Collar

As long as the collar is active (contact ATS to activate or determine activation status) and it can see the Iridium satellites in the sky, it will transmit data to the ATS server via the Iridium satellite system per its programmed schedule (available options include 4 hours to 7 days). Only successful GPS fix data sets are transmitted.

Forced full buffer transmissions

Successful GPS fixes are placed into a data transmission buffer. The data transmission buffer only allows 22 GPS fixes to be stored at a time. To prevent data from being lost, if the buffer reaches 22 fixes before a scheduled data transmission, the collar will immediately attempt to transmit the data buffer even if it is not scheduled to transmit.

Note: If a collar transmits data containing GPS fix locations more than 29 days apart, the Julian day and hour of the later data in the transmission may be incorrect. However, the data stored on the collar is correct and the next transmission should have correct data. This situation may arise if you wish to test the collar and wait more than 29 days after initial testing before deploying the collar. If this is a concern, deploy the collar as soon as possible after programming/ reprogramming the collar.

Data Access

The collar is assigned to a specific web account. When the collar transmits data, the data is uploaded to the web account. An alert may be sent to the email address registered to the collar if the collar has experienced an alarm-type event (mortality, VIT event, fawn event, low battery, collar release). The email will provide more details on the status of the collar. The collar may also be set up for SMS messaging where a text alert is sent to a user defined SMS number when an alert is transmitted. To set up SMS alerts, from the ATSideaq.net homepage, click on “Collar Dashboard” and then find the “Configuration” tab on the left side menu options. Then click the “Change SMS phone” box and proceed as if issuing a remote command.

NOTE: Alert emails come from iridium@atsidaq.net. They are automatically generated emails so it is possible that the emails may be interpreted as spam. Please allow emails from this address if you wish to view alerts via emails and check your spam folders when you are not receiving emails since security options are constantly updated.

The web account for the collar can be accessed at www.atsidaq.net. If you do not have a username and password, please contact ATS to obtain one. There are multiple features of the web account. For data, you can download GPS data, and/or Google Earth kml files. The website also alerts the user about collars that may that need immediate attention. In addition to email alerts, SMS alerts for collar events can also be set up. Lastly you can request schedule changes using the web account. For more information on schedule changes, see Section 8, Remote Commands.

The web account was designed to be self-explanatory. Please see the Help documentation on the website for more assistance. If you need further assistance that what is provided in the Help documentation, please contact ATS.

NOTE: ATS does not generally store data older than 3 years old. Please make arrangements to store data older than this as necessary.

Section 8 Remote Commands

There are several scheduling options for the collar that can be changed remotely. The settings can be changed by going to www.atsidaq.net and logging in to the web account corresponding to the collar. If you do not know the username and password for the account, please contact ATS to obtain the information.

For help issuing a remote command, please see the “Need Help?” documentation pop up link.

When a remote command is requested from the website, a confirmation email indicating whether or not ATS successfully processed the request will be sent to the email registered to the collar. If you receive an error email or no email and need further assistance, please contact ATS. A log of all remote command requests that have been made for a collar can also be viewed on the web account by clicking the “View Commands Issued” button for the collar.

Once ATS receives the remote command, the command is held in a buffer by the Iridium satellite system until **EITHER** the collar performs a data transmission, in which case the command is delivered **OR** until five days elapses, in which case the command is erased from the satellite data buffer per Iridium protocol, whichever comes first. If the latter is likely to occur, issue the command within five days of the expected data transmission.

The collar will change its schedule after it receives the remote command, not after the command is issued. Only one remote command may be executed per data transmission. If you wish, you may send multiple remote commands to be processed later by the collar but you must wait until you receive a confirmation email for each request before you send another request. **NOTE:** Any remote commands not delivered within 5 days are discarded by the Iridium Satellite System.

Section 9 Satellite Transmission Suppression

Sometimes a satellite transmission cannot be completed at the scheduled time due to satellite positioning and/or the current environment. In this case, the collar will keep attempting a transmission every 12 minutes. If a transmission cannot be completed for 10 consecutive attempts, the collar will enter Satellite Transmission Suppression (STS). In STS, normal satellite transmission attempts will not be performed. This includes the current scheduled attempt, future scheduled attempts, attempts due to full data buffers, and mortality transmissions (if applicable).

There are two ways a collar can exit STS. First, during STS, GPS fix attempts are still allowed. If a GPS fix is successful, then the collar will return to normal operation including resuming normal satellite transmission attempts. That is the primary mechanism and should work in most cases. If GPS is not functioning, a second method for exiting STS is via a satellite transmission: if the collar is currently in STS and the Julian Day is a multiple of thirty (e.g. Jan 30, Mar 1, Mar 30, etc.), the collar will attempt a satellite transmission to determine if the collar’s current environment has become more favorable. It will try a maximum of 10 times with attempts spaced 12 minutes apart. If it is successful, normal collar operation will resume, and if it is not, the collar will return to STS.

Note: The first data set transmitted after the collar exits STS may contain GPS fix data points with an incorrect Julian day and hour. However, the data is stored correctly on the collar and the next transmission will contain correct data. This error is a result of GPS data points in the transmission buffer that are more than twenty-nine days apart as may be the case with prolonged STS periods.

Section 10 Diagnostics

ATSFixes for Satellite collars has a diagnostic function to perform some diagnostics on a collar. To perform the check:

1. Connect the *Wildlink* to the PC.
2. Open ATSFixes.
3. Click on the “Diagnostic” button on the main page.
4. Swipe the magnet across the two white dots on the collar.
5. Wait for the tests to complete.

Upon completion, a window will appear detailing relevant functionality measurements and values about the collar. For a successful diagnostic, one of two different windows appears.

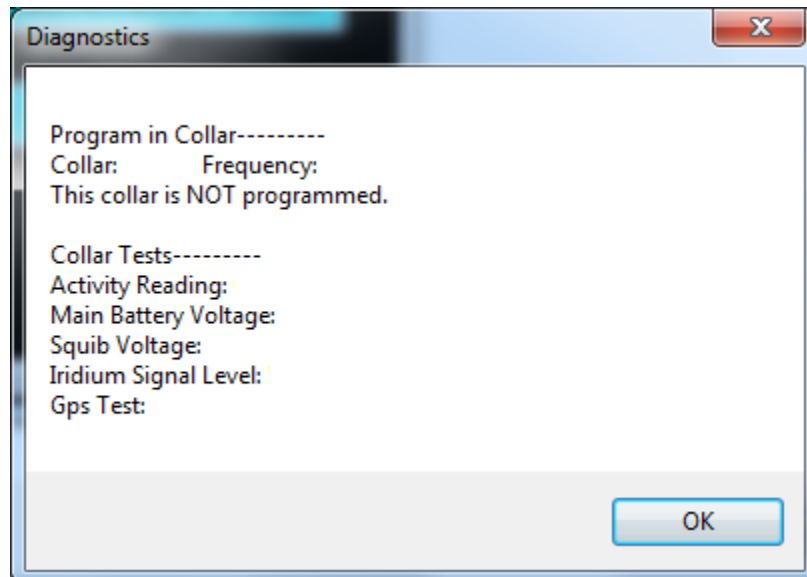


Figure 7. Diagnostic for a G2110E2 collar without a program

Figure 7 shows the window for a diagnostic assessment of a G2110E2 collar that has not been programmed. For an actual collar, the collar serial number, frequency, battery voltage, etc. will be filled out accordingly. The available information for a G5 Series collar will be similar. Note that the squib voltage data is erroneous for G5 Series collars since they do not have a built-in squib release.

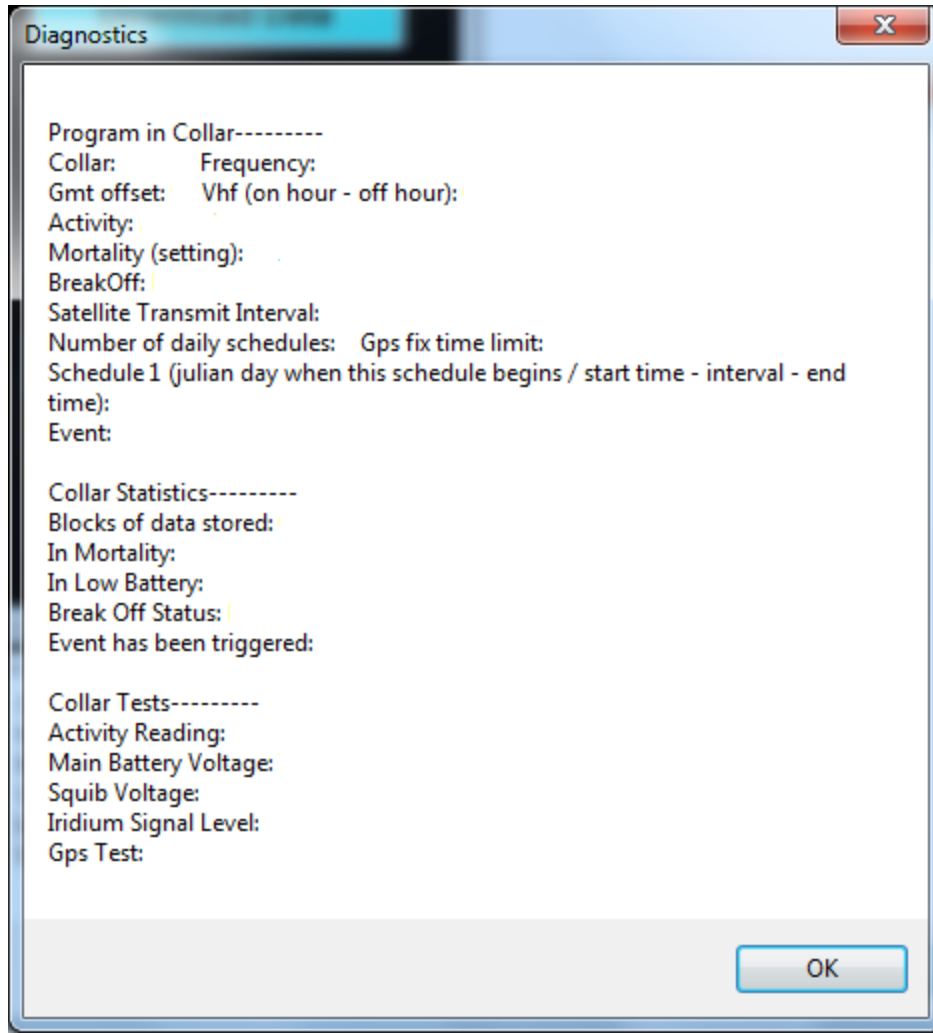


Figure 8. Diagnostic for a programmed G2110E2 collar

Figure 8 shows the diagnostic for a G2110E2 collar with a program. The diagnostic in this case will reveal specific details about the program in the collar. For an actual collar, the form will be filled out with valid information. Again, the available information for a G5 Series collar will be similar. Note that the Break Off Status and Squib voltage information is erroneous for G5 Series collars.

Section 11 Data Conversion

ATSFixes for Satellite Collars provides several data conversion processes to change the format of downloaded data. The available options are:

-Convert from Julian Day to Month and Day – converts data with Julian day format to data with month – day format.

-Remove all non-successful fixes from dataset – removes all datasets with unsuccessful fixes from the file.

-Convert to Google Earth File Format (with Lines) – creates a kml file for use with Google Earth using a file with Julian day date stamps and decimal degrees coordinates datasets. Datapoints in the output file **will be connected** with a straight line. The Julian day is left as the date stamp for the datapoints.

- Convert to Google Earth File Format (without Lines) – creates a kml file for use with Google Earth using a file with Julian day date stamps and decimal degrees coordinates datasets. Datapoints in the output file **will be not be connected**. The Julian day is left as the date stamp for the datapoints.

- Convert to Google Earth File Format (without Lines) with Month and Day – creates a kml file for use with Google Earth using a file with Julian day date stamps and decimal degrees coordinates datasets. Datapoints in the output file **will be not be connected**. The datasets are marked with month and day of the dataset instead of the Julian day of the dataset.

To perform any of these conversions:

1. Save the file to be converted under the C:\Advanced Telemetry Systems, Inc\GPS folder.
2. From the ATSFixes home screen click on Convert Data Format.
3. Choose the desired conversion type.
4. Under the 'File Name:' prompt, enter the filename of the data file you wish to convert.
5. Click on Continue.

A new file is generated with the filename described under the C:\Advanced Telemetry Systems, Inc\GPS folder.

Section 12 Neolink VIT System *** (G2110E2 and G5-2D Collar ONLY)***

The ATS *Neolink* VIT system is designed to provide an event/alert message to a user when a birth event occurs. It consists of a host collar and an ATS *Neolink* Vaginal Implant Transmitter (VIT). The collar monitors an implanted *Neolink* VIT that periodically broadcasts a wireless message regarding its current temperature (host internal temperature) and light level to the host collar. When the *Neolink* VIT transmitter is expelled during a birth, it will broadcast a birth message to the host collar when its temperature drops below a predetermined threshold

temperature (default 32C) and/or it detects light. Upon reception of this birth message, the host collar will take a GPS fix and attempt to transmit a birth alarm satellite message to let the user know of the birth event. In addition to a temperature or light trigger, the host collar will also send a birth alarm if it fails to receive a message from the VIT for one hour.

Each *Neolink* VIT must be programmed with a serial number that corresponds with the host collar. The host collar listens every 20 mins for a maximum of about 300 seconds for a message from a *Neolink* VIT (i.e. messages from other *Neolink* VITs are ignored) The serial number of the *Neolink* VIT must be the same number as the serial number of the host collar to detect it and its alarms. For example, a collar with serial number 031234 only listens to a *Neolink* VIT with serial number 031234.

The *Neolink* VIT's normal VHF beep pattern is a 30ppm pulse. Once the *Neolink* VIT temperature drops below a temperature threshold, the VHF beep pattern changes to a 60 ppm pattern.

The *Neolink* VIT uses a VHF duty cycle to increase its life. After the magnet is removed from a *Neolink* VIT, the VHF is on for 24 hours per day for 2 days. For the next 28 days, the VIT VHF duty cycle stays on for 8 hours only per day. This 8 hour period is the 8 hours after the magnet was initially removed. After these first 30 days, the VHF will once again be on for 24 hours per day.

A *Neolink* VIT birth alarm can be reset by swiping a magnet across the on/off location of the *Neolink* VIT. Whenever a magnet is swiped across or removed from the on/off location, the VIT will not broadcast a birth alarm for 72 hours, though it will still broadcast accurate temperature and light readings.

Neolink* VIT Initialization *(G2110E2 and G5-2D Collar ONLY)

The *Neolink* system must be properly initialized prior to deployment. Initialization involves programming a *Neolink* VIT with the correct serial number (SN) and synchronizing the *Neolink* VIT to the collar to make sure they are properly communicating. The following steps ensure the system is setup to detect a birth event:

1. Program the collar for VIT/Fawn Events.
 - i. Begin programming the collar according to Section 3, but do not select the "Program Collar" button yet.
 - ii. On the "Fix Schedule, Options, Estimate Life: 2" page, click on the VIT/Fawn Events in the Options box. The following screen will appear:

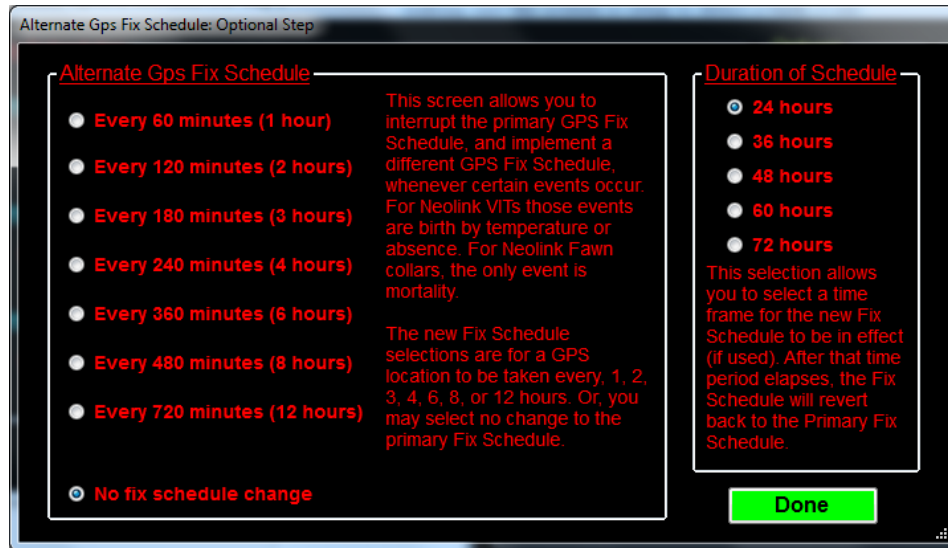


Figure 9. Events – Alternate schedule setup options

- iii. Select options for GPS fix interval and duration and click Done. These selections indicate if the collar will switch to a different schedule if an event (birth) occurs and if so, what and how long the schedule will be.
 - iv. Finally, click on the “Program Collar” button and follow the onscreen instructions.
2. Place a magnet on the collar at the magnet location until collar and VIT are ready to be deployed.
 3. Upload a SN into the *ATS Neolink* device. See Section 14 for details.
 4. Shortly before deploying, remove the magnet from the collar. This forces the collar to listen for a VIT sync communication.
 5. Then remove the magnet from the *Neolink* VIT. This forces the VIT to send a sync transmission to the collar.
 6. With a receiver, verify that the VIT is emitting VHF beeps. (If it does not emit VHF beeps within 10 seconds, consider tapping the VIT against a hard surface to open the magnetic on/off switch.)
 7. Once the VIT is emitting VHF (single pulse at 30 ppm), listen to the collar’s VHF. The collar should begin emitting VHF soon after the VIT emits VHF. If the collar does not begin emitting VHF within five seconds of the VIT being heard, place a magnet on the VIT, then repeat steps 4-6. Repeat until VHF beeps are audible from both units.

IMPORTANT:

- If the collar's VHF emits a triple beep within a span of ten seconds, then synchronization was not successful. Steps 2-6 must be repeated until no triple beeps are detected.
- If the collar's VHF emits only single or double beeps, then synchronization was successful. Keep the collar and *Neolink* Fawn within range of each other (<2 m) to maintain synchronization prior to deployment (if they can't sync, it will be an absence birth event in one hour's time).
- **IMPORTANT: VIT deployment should occur within 72 hours of removing the magnet from the VIT unit. If the units are not deployed within 72 hours, the VIT may emit a birth event signal since the temperature of the unit will likely drop below the threshold temperature (32 degrees C).**
- The current VIT temperature and light data can be read by using the Read Fawn/VIT button (see Figure 11) to make sure the VIT is functioning properly.

***Neolink* VIT Alerts and Status**

To summarize, *Neolink* birth alerts may occur for the following reasons:

1. The *Neolink* VIT temperature drops below the predefined *Neolink* VIT threshold temperature and broadcasts the alert successfully to the collar.
2. The *Neolink* VIT detects light levels higher than expected for an implanted environment and broadcasts the alert successfully to the collar.
3. The collar does not detect its *Neolink* VIT for approximately one hour (e.g. the *Neolink* VIT has been expelled but the collar is too far from the VIT to receive its broadcasts).

The alerts may happen any number of times and are not limited by any sequence. However additional alerts only happen when the status changes (e.g. if the VIT stays in low temperature detection, it will create only one alert that the collar will act on but if the VIT goes from a low temperature only detection to a high light and low temperature detection and back to a low temperature only detection, it will create three separate alerts that the collar will act on). Alerts are sent to the email address registered in the ATS Collar database.

The birth status of the *Neolink* VIT is always contained in the collar transmissions file of the collar but is also available on the www.atsidaq.net collar interface box under the Collar Event

status once you select the collar from the Collar Dashboard. The possible statuses for *Neolink* VIT events are the following:

1. “Birth not yet triggered” – the collar is detecting the *Neolink* VIT and no alarms have been detected.
2. “Birth-triggered by temperature” – the collar is detecting the *Neolink* VIT but the *Neolink* VIT is reporting a temperature lower than the birth threshold temperature.
3. “Birth-triggered by light” – the collar is detecting the *Neolink* VIT but the *Neolink* VIT is reporting higher than expected light levels for an implant environment.
4. “Birth – triggered by light and temperature” – the collar is detecting the *Neolink* VIT but the *Neolink* VIT is reporting both a low temperature and a high light level.
5. “Birth-triggered by lack of comm” – the collar is not detecting its *Neolink* VIT.
6. “Unknown-No Sync” – the collar is programmed for *Neolink* capability but has not yet detected any communication from an appropriate *Neolink* device.

Transmitted *Neolink* VIT Data *(G5-2D and G5-2D Collar ONLY)*

A collar paired with a *Neolink* VIT will transmit GPS datasets that are different than a normal collar. The normal data file downloadable from the www.atsidaq.net website has data columns indicated by the column headers. However, the datasets for a collar communicating with a *Neolink* VIT will contain several substitutions that provide feedback regarding the *Neolink* communications and the *Neolink* VIT itself.

Instead of fix dimension data that is normally available in the “2D/3D” column, the data in this column will show how many times the collar received a message from the *Neolink* VIT since the previous fix. For example, since the collar listens for a *Neolink* VIT broadcast every 20 minutes, a GPS fix rate of every 3 hours, and a 100% reception rate would produce a ‘9’ in the dimension column. A ‘0’ would mean no messages were received since the last GPS fix.

Another substitution that will occur is data in the “Temperature” column. Normally this information is the approximate temperature of the collar but in a *Neolink* VIT system, this temperature is the last received temperature reading (in degrees Celsius) from the *Neolink* VIT. A low last received temperature may, for example, confirm a birth event.

Instead of GPS on time data being displayed in the “FixTime” column, this column will contain the *Neolink* VIT light data. The light value is between 0-102 where a value of 102 means that the *Neolink* VIT is not detecting any light and lower values indicate that high light levels are being detected. Lower light values may confirm a birth.

Finally, the transmitted datasets for a collar communicating with a *Neolink* VIT will show ‘0’ values for the “HDOP” and “NumSats” column. Those columns are reserved for *Neolink* Fawn use (see section 13 for more details).

When the collar no longer detects *Neolink* VIT broadcasts, the datasets will revert back to the standard datasets i.e. dimension column represents dimension of the fix, temperature represents the temperature of the collar, etc.

Also, the data substitutions mentioned above only pertain to transmitted datasets. Recovering a collar that was programmed with *Neolink* VIT capability and downloading the datasets will lead to data with the formats described in section 6.

***Neolink* VIT Remote commands**

When possible, the *Neolink* system should be disabled to conserve battery life especially when the collar is no longer detecting its *Neolink* VIT i.e. the collar transmissions indicate a “lack of comm” status. (However, if a *Neolink* Fawn is deployed for the collar shortly after a birth, disabling the *Neolink* system may not be necessary.) The *Neolink* system can be disabled remotely using the command options for the collar at the atstidaq.net website and clicking on the *Neolink* Commands button to access the *Neolink* and Geofencing options (see Figure 10).

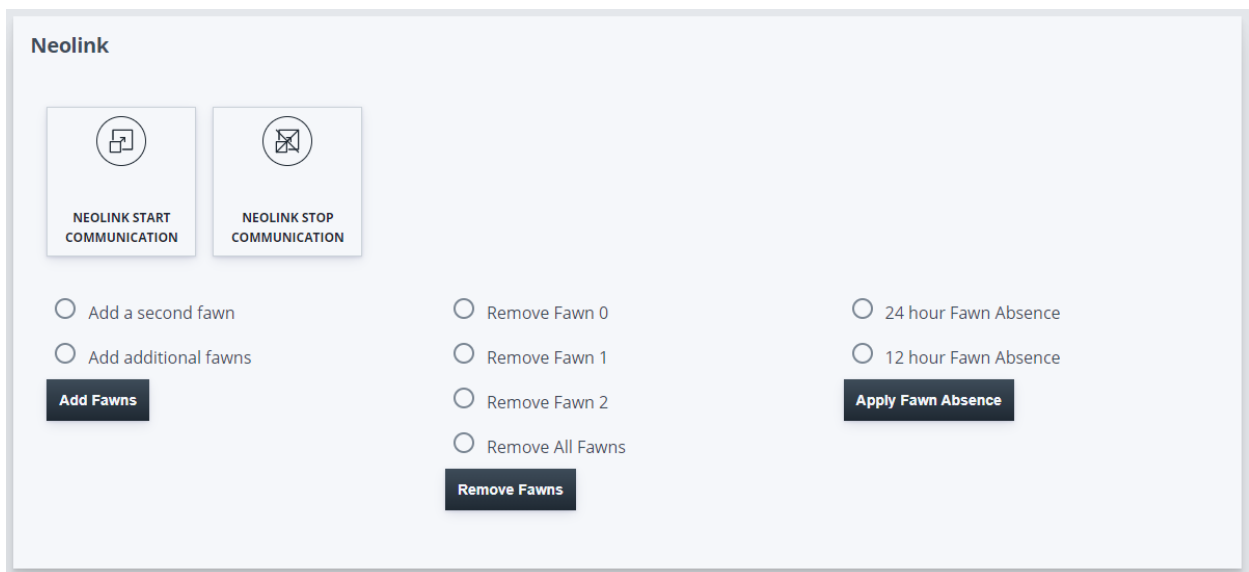


Figure 10. Neolink Commands

Clicking on the *Neolink* Stop Communication button and confirming that the option will disable *Neolink* functionality for the collar when the collar receives the command.

If for any reason, the *Neolink* capability must be activated again, a remote command can be sent to the collar to re-enable *Neolink* communication attempts. To do so, go to the *Neolink* commands and select the “*Neolink* Start Communication” option to enable *Neolink* communications.

Neolink VIT Event Data

When programmed with *Neolink* capability, the collar contains an event log for *Neolink* device message receptions. The event log shows the times the collar received *Neolink* VIT broadcasts as well as the data that the *Neolink* VIT broadcasted. To download the data, from ATSFixes for Satellite Collars:

1. Select the collar's product model.
2. Click on the Download Data box.
3. In the "Choose Download Data" box, enable the Event Data button.
4. Click on the "Continue" button.
5. Swipe a magnet across the magnetic on/off switch position and wait for the download to complete.

Section 13 Neolink Fawn Collar System

(G2110E2 and G5-2D Collar ONLY)

The *Neolink* Fawn system is designed to provide the proximity and mortality status of a *Neolink* fawn collar to a host collar in a doe-fawn system. Specifically, it is designed to let the user know the following information about a *Neolink* Fawn collar: 1) whether it is in the general area of its corresponding host collar or not, and 2) whether the *Neolink* Fawn collar has gone into mortality due to inactivity or not.

In order to accomplish this, the *Neolink* Fawn collar periodically broadcasts either a presence message, or an alarm message. A presence message is intended to let a collar know that the *Neolink* fawn collar is nearby. An alarm message lets the collar know that the *Neolink* Fawn collar is nearby, but has also gone into mortality. If the collar is close enough to the *Neolink* fawn collar when it listens for incoming broadcasts, the collar will register the broadcast, and depending on if the status of the fawn collar has changed from its previous status, will transmit a satellite alert about the change.

The normal VHF pattern for the *Neolink* Fawn collar is a 30 ppm single beep. Once the *Neolink* fawn collar goes into mortality and begins broadcasting a mortality message, the VHF pattern is a 60 ppm single beep. Also, after going into mortality, the *Neolink* Fawn collar stays locked in mortality mode for a preprogrammed lock period. Mortality can be reset sooner than the lock period by swiping a magnet across the designated magnetic on/off position.

Each host collar may have up to three different *Neolink* Fawn collars that it registers information from. All *Neolink* fawns must be given a six-digit serial number (SN) that corresponds to a G5 Series host collar. The first fawn **MUST** be given a SN beginning with a 0. A second fawn **MUST** be given a SN beginning with a 1. A third fawn **MUST** be given a SN beginning with a 2. For all three possible fawns, the next five digits will be the same as the last five digits of the host collar. For example: the possible fawn SN's for a G5 Series host collar 031234 are: 031234, 131234, and 231234.

Neolink Fawn Collar initialization *(G2110E2 and G5-2D Collar ONLY)*

Neolink Fawn collars can be deployed with or without access to the host collar. The following steps ensure that the *Neolink* Fawn system will work correctly.

1. Program the G5-2D host collar for VIT/Fawn Events. See Section 14 for details. NOTE: If the collar was previously programmed for VIT/Fawn Events for use with a *Neolink* VIT, the programming carries over as long as the *Neolink* system has not been disabled with a remote command. For operation with *Neolink* Fawns, the collar will start out listening for any *Neolink* device (VIT or Fawn) every twenty minutes for approximately five minutes but will revert to looking every twenty minutes for approximately twenty seconds when it determines that associated *Neolink* Fawn collar(s) are broadcasting messages. Note: The Alternate GPS Fix schedule will apply if the collar detects a new message that a *Neolink* Fawn collar is in mortality.
2. If deploying the host collar at the same time as the fawn collar(s), place a magnet on the collar until ready for deployment. Otherwise, no further action is necessary with the collar.
3. Upload a SN into the *Neolink* Fawn collar. See Section 14 for details.
4. If deploying two or three *Neolink* Fawn collars, they should be synchronized together before deploying. Fawn collar '0', which is the fawn that has serial number starting with '0', is the lead fawn. The other fawns synchronize to it.

To synchronize them, remove or swipe the magnet on a *Neolink* Fawn with the serial number that begins with a '0'. Leave the collar turned on by keeping the magnet off of fawn '0' until deployment.

Next, listen to the VHF beep pattern of 'fawn1', the *Neolink* Fawn with serial number beginning with '1'. Swipe the magnet of 'fawn'1. There will be silence until it synchronizes. When it synchronizes, there is a very long beep. If you do not hear this very long beep, repeat the process. Listen to 'fawn1', swipe the magnet on 'fawn1', and again, listen for the long beep. Once the long beep is heard, 'fawn1' is synchronized. Make sure 'fawn1' remains turned on by keeping the magnet off of the collar until deployment.

If there is third *Neolink* Fawn which is the fawn collar that has its serial number beginning with a '2', remove the magnet at this time. The process is the same. Listen to the VHF of 'fawn2', then swipe the magnet on 'fawn2'. Listen for the long beep that tells you 'fawn2' is also synchronized. Make sure 'fawn2' is not turned off by leaving the magnet off until deployment.

Fawns broadcast every 20 seconds, so listening to a synchronization attempt should only take approximately 20 seconds. This step sets the *Neolink* Fawn broadcasts so that there are no initial interference issues.

After synchronizing the devices, in order to maintain synchronization, DO NOT apply magnet(s) to the *Neolink* Fawn collar(s). **IMPORTANT: Be sure to deploy the collar before the mortality period is reached. Otherwise, the collar(s) will go into mortality mode, and stay locked in mortality for the Mortality lock period or until it is reset with a magnet swipe.**

5. When ready to deploy the system: if deploying a host collar at the same time as the *Neolink* Fawn collar(s), remove the magnet from the collar in the presence of the Fawn collar(s) and verify that in 20 seconds, the VHF for the host collar comes on.

- If VHF comes on, the *Neolink* system is ready to be deployed.
- If the VHF does not come on, wait for VHF on the collar to come on to verify that synchronization was not successful. Then repeat step 3 and step 4 (if using more than one fawn) and attempt to synchronize again.

If deploying the *Neolink* Fawn collar(s) without access to the host collar, simply deploy the Fawn collar(s), preferably before the mortality period is reached. When the already deployed host collar hears the *Neolink* Fawn collar(s), it will immediately recognize the changeover to *Neolink* Fawn communication.

***Neolink* Fawn Alerts and Status**

When used in a *Neolink* fawn system, the collar will transmit an alert when:

1. The host collar detects a *Neolink* Fawn after not detecting the *Neolink* Fawn for a certain period. This period is known as the absence period and it is defaulted to 12 hours. (e.g. the host collar is now close to the *Neolink* Fawn collar but for the past 12 or more hours, the host collar was too far from the *Neolink* Fawn collar to detect the *Neolink* Fawn broadcast). This is declared as a “Comm” event in the email alert.
2. The host collar receives a new broadcast message from the *Neolink* Fawn collar that it is now in mortality. This is declared as a “Mortality” event in the email alert.
3. The host collar has not detected a *Neolink* Fawn collar for a certain period but the *Neolink* Fawn collar was previously detected. The period is defaulted to 12 hours but can be changed to 24 hours. For example, the host collar detected fawn ‘0’ 12 hours ago but has not detected the fawn since that time – it transmits an alert to indicate the absence of fawn ‘0’. This is declared as an “Absence” event in the email alert.

Alerts are sent to the email address registered in the ATS Collar database.

The status of the *Neolink* Fawns is always contained in the transmitted datasets of the host collar. In addition to the alerts, mentioned above, email alerts may be generated by the ATS data server when the status (presence, absence, or mortality) of the *Neolink* Fawn collar(s) has changed since the last received transmission.

The status of the *Neolink* Fawn collar(s) is available on the www.atsidaq.net interface box for the host collar under the Collar Event status. The status will look like the following

“Collar Event: Fawn0-[status],Fawn1-[status] (if available),Fawn2-[status] (if available)”

Similar to the email alerts, the possible status messages available from the website are:

1. Comm – the host collar detected the *Neolink* Fawn prior to transmitting its most recent satellite data packet and no mortality for the fawn collar was been detected
2. Absence – the host collar did not detect the *Neolink* Fawn prior to transmitting its most recent satellite data packet
3. Mortality – the host collar detected the *Neolink* Fawn prior to transmitting its most recent satellite data packet but the *Neolink* Fawn broadcasted a mortality message.
4. Not yet triggered – the host collar is looking for a fawn but it has not been detected yet.

Status indications for fawn 1 and fawn 2 are only available if the host collar has detected them OR if the host collar has been remotely commanded to look for them.

Lastly, the ATS data server may generate an email alert when the host collar is no longer detecting any *Neolink* Fawn broadcasts. This alert typically coincides with a potential Absence.

Transmitted *Neolink* Fawn Data *(G2110E2 and G5-2D Collar ONLY)*

Similar to the *Neolink* VIT system, a collar paired with *Neolink* Fawn(s) will deliver data messages containing data substitutions. When data is downloaded from the website for a host collar in a *Neolink* Fawn system, the data shows how many times the host collar has received broadcasts from any corresponding *Neolink* Fawn(s) between GPS fixes.

The number of detections from Fawn 0 are substituted into the “2D/3D” column. The number of detections from Fawn 1 are substituted into the “NumSats” column. Finally the number of detections from Fawn 2 are substituted into the “HDOP” column. For example, if the host collar takes a GPS fix every 3 hours, a 100% detection rate would show a value of ‘9’ for a *Neolink* Fawn collar.

The collar data does not have any other substitutions besides those mentioned.

The data will revert back to data defined by the normal headers once the host collar does not detect ANY *Neolink* broadcasts for the absence period (default of 12 hours).

Similar to its usage in a *Neolink* VIT system, the collar does not make the data substitutions above in the onboard memory. If the collar’s data is downloaded using ATSFixes, the data will be as specified in section 6.

***Neolink* Fawn Remote Commands**

The *Neolink* Fawn system has several remote commands on the www.atsidaq.net website that may be used to enable and disable it. To access these remote commands, go to the Collar Dashboard and click on the *Neolink* Commands button to access the *Neolink* options (see Figure 10).

From there, the following options are applicable to the *Neolink* Fawn system:

1. *Neolink* Start Communication- This command enables *Neolink* detection on the collar. Upon receiving this command, the collar will begin listening for a *Neolink* broadcast
2. “Add Fawn ‘1’” and “Add Fawns ‘1’ and ‘2’” – These commands inform the collar to listen for more than one fawn. Upon receiving these commands, the collar listens specifically for additional fawns.
3. “Remove Fawn ‘0’”, “Remove Fawn ‘1’”, “Remove Fawn ‘2’”, “Remove All Fawns” – use these commands to disable searches for the specified fawn(s). Upon receiving these commands, the collar ceases listening for the fawns indicated.
4. *Neolink* Stop Communication – use this command to disable *Neolink* detection. Upon receiving this command, the collar no longer listens for *Neolink* message broadcasts.

***Neolink* Fawn Event Data**

When programmed with *Neolink* capability, the collar contains an event log for *Neolink* device message receptions. For *Neolink* Fawns, the event log shows the times the collar received *Neolink* Fawn broadcasts and indicates which fawn, if there is more than one being used, broadcasted the message. To download the data, from ATSFixes for Satellite Collars:

1. Select the collar’s product model.
2. Click on the Download Data box.
3. In the “Choose Download Data” box, enable the Event Data button.
4. Click on the “Continue” button.
5. Swipe a magnet across the magnetic on/off switch position.

Section 14 Programming a *Neolink* Device

(G2110E2 and G5-2D Collar ONLY)

Any transmitter device operating as part of a *Neolink* system must be programmed with a valid serial number before being used. The following steps describe how to program a serial number into a *Neolink* device. When possible, place magnets on all *Neolink* devices not currently being programmed to prevent interference issues with programming.

1. Connect *Wildlink* Comm module to a Windows PC.

2. Run *ATSFixes* for Satellites software.
3. From the Product Model drop-down pick list, select “Fawn or VIT”.
4. For Serial Port, select the COM port associated with the *Wildlink* Comm module.
5. Click on the “Fawn or VIT” button. The following screen will appear:

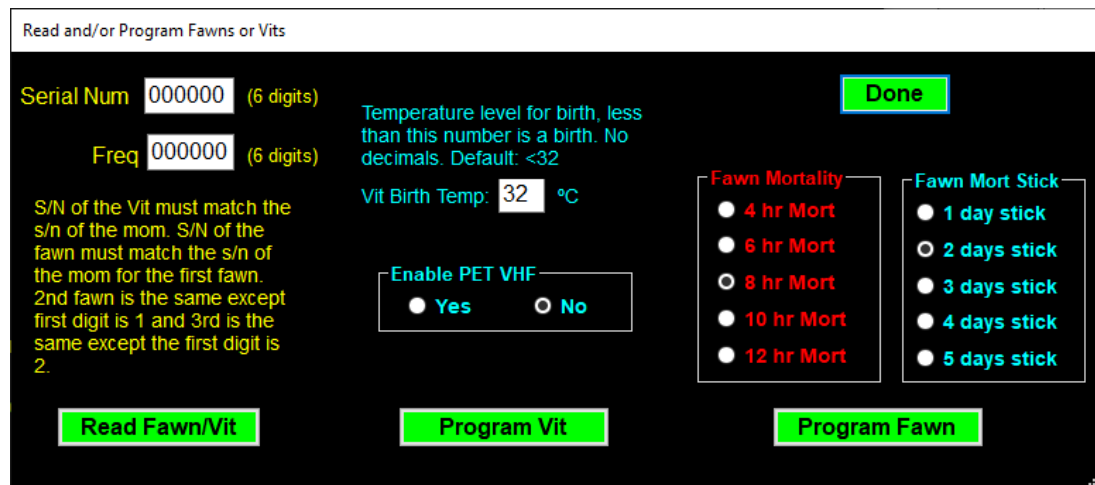


Figure 11. *Neolink* Programming

6. Enter a six-digit serial number in the “Serial Num” field. For *Neolink* VITs, this number is the same as the collar that it will be paired with. For *Neolink* Fawns, this number contains a first digit of 0, 1, or 2, and the remaining 5 digits are the same as the last five digits of the host collar.
7. For a *Neolink* VIT, select a birth temperature and whether or not to use a PET (Precise Event Timer) VHF. For a *Neolink* Fawn, select the desired options for the Fawn mortality period, and also the fawn mortality lock (“Mort Stick”) period.
8. For VIT programming, click on the “Program VIT” button, and for fawn programming, click on the “Program Fawn” button.
9. Swipe the magnet over the designated on/off magnet location on the *Neolink* device and wait for a “Success” response from the software. If an error message appears, e.g. “Error in setting up Fawn!!” recycle power on the *Wildlink* device by removing the USB cable from the device, and plugging it back in. Once you hear VHF beeps being emitted from the *Neolink* device, click on the appropriate button to reprogram the unit again.
10. Click on the ‘Read’ option under ‘Model VIT/Fawn and swipe the magnet over the on/off location again.
11. Verify that a window appears with the information that was just entered. If the information displayed is not correct, repeat steps 6 through 10.

12. Place and tape a magnet onto the designated on/off location of the device.

Section 15 Geofencing System

The ATS Geofencing System is an on-collar system designed to provide an event/alert message when a collar acquires a fix location inside or outside a fenced polygon (i.e. bounded area). The alert message indicates what polygon the collar has entered or if the collar is outside all polygons, if enabled. The polygon is uploaded into the collar during ATSFixes programming.

Each collar may be programmed with up to 4 polygons, with each polygon having up to 20 distinct latitude/longitude points. The polygon can be imported as a Google Earth .kml file or as an ESRI shapefile. In addition to providing an alert when the collar acquires a GPS fix inside or outside a polygon, the collar can also autonomously adjust its GPS fix schedule to a different schedule when it determines it has entered or exited a polygon.

Setting up Geofencing

To enable Geofencing:

1. Begin programming the collar according to section 3, but do not select the “Program Collar” button yet.
2. On the “Fix Schedule, Options, Estimate Life: 2” page, click on the Use Geofencing bubble in the Options box. This will take you to the following screen (Figure 12):

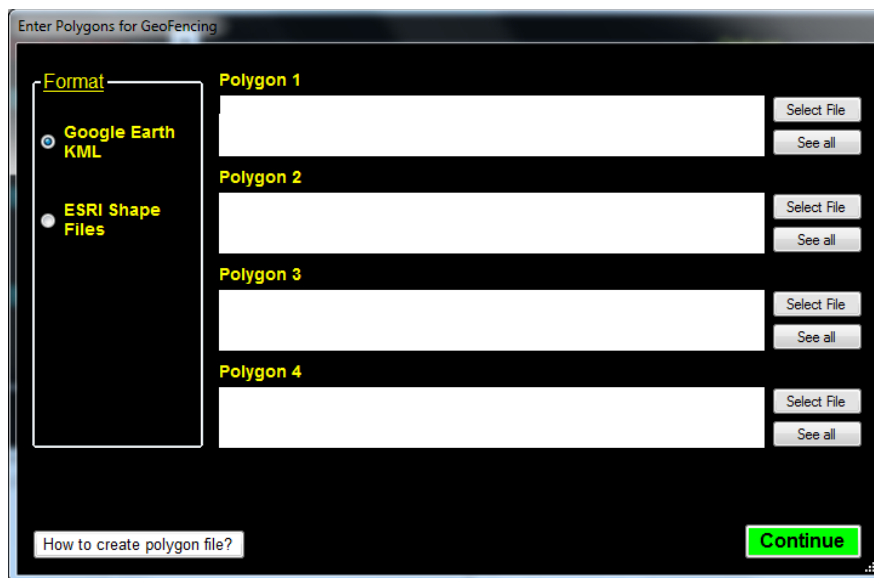


Figure 12. Enter Polygons for Geofencing window

3. Next, fill in the polygons that the collar will be using beginning with Polygon 1. Before clicking on the “Select file” button, select the type of format the file will be using under the Format box on the left hand side. A “How to create polygon file?” button exists to provide assistance with generating an acceptable kml file for ATSFixes uses. Please consult the ESRI shapefile software for assistance with generating a shapefile if shapefiles will be used.
4. Once all applicable polygons are imported (NOTE: Four polygons are not required for Geofencing), click on the green Continue button. The following Geofencing options window will be displayed next:

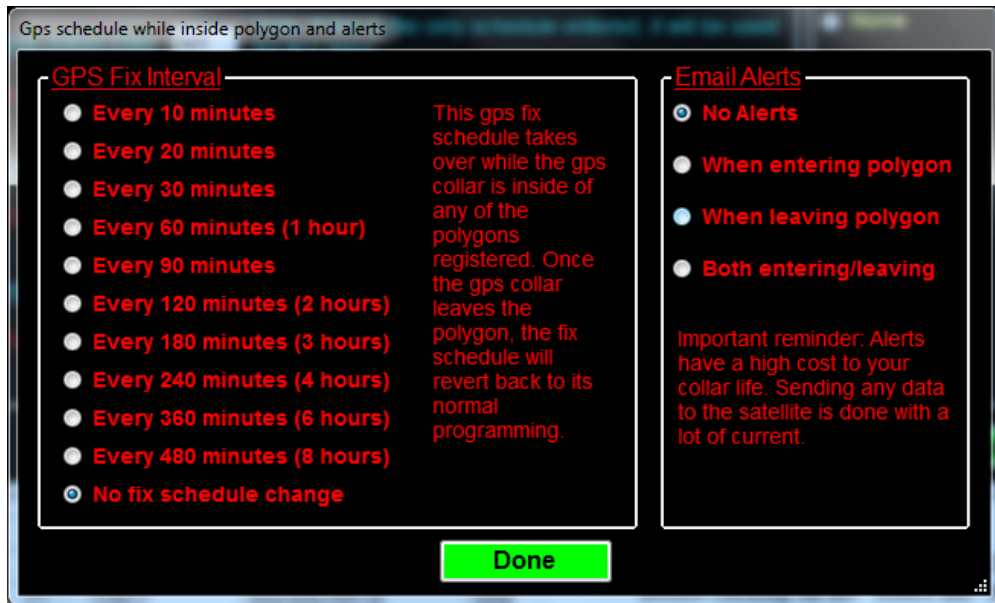


Figure 13. Gps schedule while inside polygon and alerts window

5. The GPS Fix Interval box provides options for an alternate schedule when the collar determines that it is in a polygon. Select a desired polygon GPS schedule or select No fix schedule change if not change is desired.
6. The Email Alerts box provides options for alerts when the collar enters and exits a polygon. Select the desired alert option.
7. Click on the green Done button when all Geofencing options have been made to return to the main programming window.
8. Click on the green Program Collar button when ready to upload the program to the collar and follow the onscreen instructions.

Disabling Geofencing

Geofencing can be remotely disabled for a collar from the www.atsidaq.net website. From the Collar Dashboard, go to the Commands tab and then click on the “Stop Geofencing” button. Next, click on the box next to the collar that needs the Geofencing feature to be disabled and click on the “Apply to Selected Collars” button. Then confirm command as necessary.

NOTE: Once disabled remotely, Geofencing cannot be re-enabled without reprogramming the collar.

Section 16 Warranty and Service

The ATS G2110E2 and G5 Series collars are warranted for one year from the time of shipment.

NOTE: G5 Series collars ARE NOT refurbishable. Do not return collars for refurbishment or disposal.

Should you encounter any difficulty during programming or operation of your collars, please contact ATS Sales and Service at 763.444.9267 during normal business hours. This and other ATS User Manuals, as well as software, are available for download from the ATS website, at www.atstrack.com.