Lotek

SRX1200 Receiver User Guide

For SRX1200 and SRX1200-D

Preliminary

January 2020, Revision 2

WELCOME TO THE SRX1200

SRX1200 comprises a family of receiver that share similar hardware and functionality. Its design so enables users to select and upgrade a receiver from a suite of available model-specific features to best meet evolving research objectives and budget constraints.

The SRX1200 is designed for use in either/both mobile and logging applications and supports either manual scanning with dynamic input from the user, or autonomous scanning through user-selected frequencies and or antennas for signal transmissions from Lotek radio transmitters. For convenience, available features for available SRX1200 models specified below are presented in this manual (*the term "model" in this manual and in this context is strictly referring to the user scalable features which can be enabled or disabled in the software. Hardware-wise and regulatory-wise, there are only two formal models, namely SRX1200 and SRX1200-D, which have two different enclosures*). Operation of SRX1200 (as below) are described under Section I, while operation of the SRx1200-D designed exclusively for logging are described under Section II. Applicability/availability of certain described features will depend on the purchased variant.

SRX1200 Model	Basic Description	
M1	Receiver12MHz Entry -Level Mobile Tracking Receiver	
M2	12MHz Full-Feature Mobile Tracking Receiver	
MD1	12MHz Entry -Level Mobile Tracking & Datalogging Receiver	
MD2	26MHz Entry -Level Mobile Tracking & Datalogging Receiver	
D1	12MHz Motus Datalogging Receiver	
D-2	12MHz Entry -Level Datalogging Receiver	
D-3	26MHz Full-Feature Datalogging Receiver	

We trust you find the SRX1200 and its extensive list of available features and options beneficial to your project and encourage you to review the manual in detail well in advance of your field work to optimize the information for your study. Contact Lotek for details on updates and upgrades available for the SRX1200 receiver you have selected.

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SECTION I SRX1200 Series

TECHNICAL SPECIFICATIONS

Operating Voltage	9 V (+/- 1 V)
Operating Current	250-450 mA @ 9 V
Battery Life (6 x C cell 1.5 V Alkaline)	Standard: ~16 hrs. @ 20°C (LCD back light off) ~12 hrs. @ 20°C (LCD back light on)
Operating Temperature	-20°C to +50°C (LCD: from -5°C)
Weight	~2 kg (without batteries)
Size	~21.5 x 20.3 x 7.7 cm
Memory	1MB -128 MB
Storage Temperature	-30°C to +55°C
Relative Humidity	95 %
Altitude Rating	2000 m
RF Parameters	
Operating Frequency	138-176 MHz
VHF Input Impedance	50 Ohm
Frequency Resolution	1 kHz
Frequency Stability	5ppm
Sensitivity	
Minimum discernible	-150 dBm
Minimum discernible	-135 dBm

RECEIVER CARE, MAINTENANCE AND SERVICE

The SRX1200 is a dust and splash proof receiver designed for extended operation under adverse conditions that can arise in field research applications. To maintain peak receiver performance and high signal sensitivity levels, care during handling and transport is nonetheless recommended.

- For basic cleaning, wipe the housing and front panel gently with a soft cloth using a mild solution of soap and water. Avoid use of solvents. Should protective rubber caps be removed for cleaning, avoid allowing any liquid to infiltrate into the receiver. Store in a cool dry environment.

- Always use the head-phones provided by Lotek (stereo plug, 30 Ohm speakers). With ear bud jack inserted in the front panel port, the audio signal is disconnected from the main speaker and routed through the head-phone speakers.

- Where applicable, always use the GPS antenna provided by Lotek (3V active antenna)

- Always use the AC to DC power adapter provided by Lotek. Avoid using other power supplies, even if they appear to provide the correct 9 V DC voltage. Verify that the overload protection LED on the rear panel green is green. If the LED is red, the receiver will not operate, as this signifies probability of an improper power source.

- During use in autonomous logging applications, avoid sealing receiver in small non-ventilated enclosures subject to wide daily temperature fluctuations.

- ***Do not attempt to remove housing to access internal receiver assemblies, as this may void your warranty. In the event your receiver appears to have a malfunction and fresh batteries have been correctly installed, contact and advise*** **Lotek** ***for additional support. As required, we will arrange to have your receiver returned for service.***

- ***Do not use the receiver outside the specified conditions. Improper use may affect performance or damage the receiver.***

SRX1200 RECEIVER LAYOUT

FRONT PANEL

1- 2-line 24 Character LCD Display

2 - Topside housing speaker

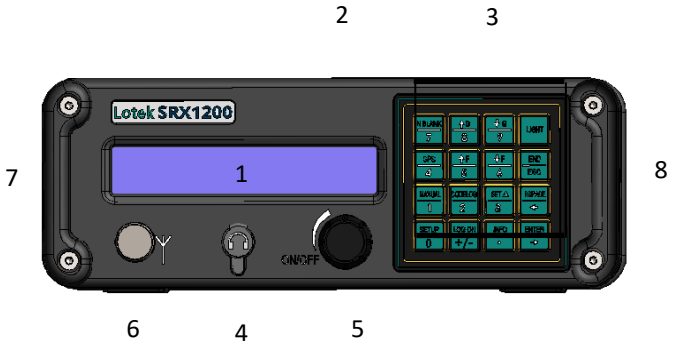
3 - 16 key membrane keypad

4 - 1/8” (3.5mm) standard headphone jack

5 - Power ON/OFF Volume Control

6 -50 Ohm BNC VHF antenna (ANT) jack

7, 8 - Slotted carry-strap handles



BACK PANEL

1, 2 - Threaded Battery Compartment Lid

3

4 - Power Indicator (Green/Red) LED

5 - 9VDC, 1A Input

6 - USB Port Type B

7 – USB Port Type A

8, 9 - Feet

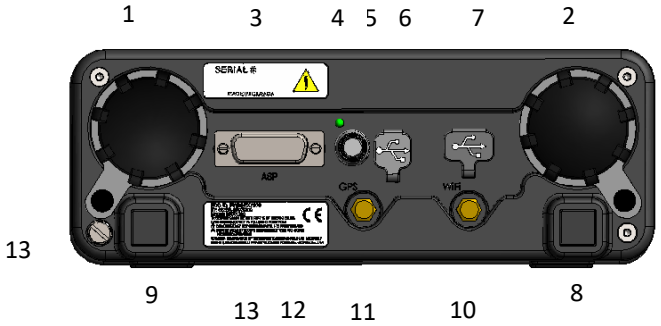
10 - WiFi Connection

11- GPS active antenna connection

12- Antenna Switching Peripheral (ASP) Port

13 - FCC/CE Label

14 - Ground screw



INTERNAL POWER

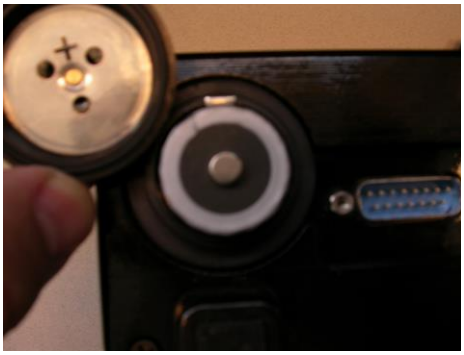
The SRX1200 operates using either six primary alkaline 'C' cells or with secondary rechargeable batteries. Each battery compartment (accessible from the back panel) accommodates three 1.5 V 'C' cell batteries. With new primary batteries installed, the receiver can operate continuously for up to 12 hours (backlight on) or 16 hours (backlight off). Operational life to battery replacement will vary owing to battery manufacturer, temperature during operation, periods between storage and usage, as well as how a receiver may be configured. During periods of extended storage, batteries should be removed from the receiver.

It is always advisable to verify battery status prior to scheduled field work and when possible to have replacement cells on-hand. Replace all batteries at the same time. Avoid mixing used and new batteries. Use batteries from known manufacturers, e.g. Energizer, Duracell, and dispose of used batteries in accordance with applicable practices, regulations to your region.

When receiver battery is low, a small square low battery status icon is presented on the receiver screen display.

To install /replace batteries:

1. Turn the receiver OFF and remove the 9 VDC power supply adapter, if connected
2. Position the receiver with the back panel facing up
3. Unthread one battery compartment lid at a time, gently tilting the receiver to a point where the old batteries slide out of each compartment.
4. Insert three new batteries, observing the correct polarity. The positive terminal of the battery should always face up as indicated on the inside of the lid and as shown below.



5. Reattach threaded lid and repeat procedure with second compartment.
6. Turn the receiver ON to verify correct operation

EXTERNA

An
back panel. The adapter jack has a circular thre
power connection to the receiver remains secur
CSA and CE) power supply provided by Lotek accepts 110 V, 60 Hz and 220 V 50

Hz Adapters must be used to accommodate power requirements specific to each country. Avoid use of generic power adapters.

Connecting the external power supply as described disables use of internal battery power. Removing the external power connector re-engages the internal power system to resume the receiver operation if functional batteries are installed.

KEYPAD AND DISPLAY

The keypad and LCD screen define the interface through which user-configurable parameters are programmed and instructions are issued to the receiver. Features and functional parameters are nested in a hierarchal design to simplify navigation through menus and pages. All aspects of the program are accessed through keys on the keypad.

All keys except **Light** have two functions. Which of the two functions is active and accessible depends on previous key selections and the corresponding state of the receiver relative to the command hierarchy sequence. Keys labeled **Setup**, **Log On**, **Info**, **Manual**, **Codelog**, and **Set Delta** provide access to menus and related sub-menus. The **Setup**, **Manual**, and **Codelog keys access modes**. Through these modes, specific aspects of the receiver's functionality can be enabled, disabled, or amended.

The LCD screen is a two-line display and is used to present and enter data, as well as to issue command instructions and assist in navigating through available menus and pages. Each LCD screen presented is referred to as a page. Menus may often contain several pages to display necessary information and options. To scroll through pages, use the right and left arrow keys or the **END/ESC** key.

The LCD display also provides current setting information. The information displayed depends on whether the receiver is Online or Offline (refer to Logging on to Receiver section). If the receiver is Online, the LCD shows the current settings within brackets after the page title and allows new values to be entered. If the receiver is Offline, the LCD shows the current settings after the title of a page, but there is no provision for a new value to be entered.

KEYPAD NAVIGATION

KEY	FUNCTION
ENTER	Once a value is entered, pressing the **Enter** key causes the receiver to accept that entry and save it, provided the receiver is Online.
END/ESC	The END/ESC key is used for menu navigation, for cancelling incomplete inputs, and for stopping receiver actions in Online mode. During navigation, this key allows users to return to the previously displayed menu. For example, after enabling TOA, press the END/ESC key to return to the Scan Options menu where the TOA feature was first accessed. The END/ESC key can also be used to cancel an input prior to entry (for example while entering a frequency 148.100). Many inputs are accepted automatically, as soon as an appropriate number of characters are entered. If number is only partially entered and a correction is to be made, pressing the END/ESC key cancels the operation. When the receiver is Online, the END/ESC key can also be used to stop the current operational state, e.g. GPS position acquisition, Scan Cycle, of the receiver. This action depends on the receiver's operational mode. When the receiver is Offline, this END/ESC function does not apply.
NUMBER KEYS	Keys with a number (**0** through **9**) designation are used in two ways: to select menu items and to enter in numeric values. All selectable menu items have a number designation, e.g. **1) Gain**. To select a menu item, press the corresponding number on the keypad. In this example, press **1** to access the Gain menu. When prompted for a numeric input, use the keypad numbers to enter a value.
DECIMAL	The lower portion of this key provides the decimal point needed for many input values.
+/- SIGN	Plus (+) or minus (-) signs are provided at the beginning of some input prompts (e.g. **>+**). Minus signs are necessary when entering the GMT correction into the receiver. To change a sign, press the **+/-** key once.

ARROW KEYS The **Right** and **Left** Arrow keys are used for navigating forwards and backwards between menu pages. If more than one page is available, a "**>**" or a "**<--**" symbol appears in the lower-right corner of the LCD. Multiple pages are used to accommodate the limitations of a two-line display; any menu items or inputs that exceed this space must be spread out. For example, to see all of the menu options from the Search page in **Manual** mode, use the right arrow to scroll through the next two pages of menu options. The only time an arrow prompt in the lower right corner is not provided is when the receiver's battery is low. In this case, a small square icon is provided indicating low battery status.

BSPACE The Backspace key erases the value of an input one number/value at a time. This is similar to using the backspace/delete key on a computer keyboard.

INFO When accessing the **INFO** key menu items, it is not possible log on to the receiver. The **INFO** key provides access to:

- Battery voltage [**1)Bat**]
- Available memory (in Kilobytes) [**2)Mem**]
- Configuration settings (Scan Time and Code Set) [**5)Cfg**]
- Service information (receiver Serial Number and number of hours in operation since last servicing) [**6)Service**]
- The factory password (123456) [**7)Factory Password**]
- Ability to answer an incoming call via the Modem [**8)Answer Incoming Call**] This feature is provided for testing and troubleshooting purposes. When a modem is being used to access the receiver, it rings when a call is made. The receiver is programmed to automatically answer all calls made. If the receiver does not answer after the modem rings four or more times, verify that the auto-answer feature is enabled.
  The call can still be answered via **Info > 8)Answer Incoming Call**.

LIGHT Press the **Light** key to switch the LCD backlight on or off. Use of the backlit display consumes more power, but is useful in low-light conditions.

NBLANK Press the key to enable and disable noise blanking. Noise blanking suppresses audio response of the receiver to eliminate white noise until a signal is received. When a signal is detected audio performance is enhanced. This feature can prevent fatigue when using the receiver for extended periods of time in aircraft or other noisy environments.

GAIN ADJUSTMENT

The SRX1200 Gain value range is 0-99 and is applied to increase/decrease receiver sensitivity. Gain value is adjusted/selected using the **Up** or **Down Arrows**. The amount of gain increment or decrement SET Δ can be specified as described on Page 13.

The appropriate gain setting depends on prevailing local ambient noise conditions at the intended study set. Increasing gain and sensitivity better enables signal detection at reception limits of the system, but will also amplify noise events. For autonomous data logging applications in particular, gain setting adjustment represents an important consideration during the calibration process, to optimize data collection efficiency of your telemetry system. Use of the AGC (Adaptive Gain Control refer to page 24) feature can also be helpful in compensating for anticipated fluctuations in local ambient noise.

The power of the received signal is reflected in the SRX1200 as an RSSI (Relative Signal Strength Indicator) value. For practical purposes, RSSI values will range from low values, e.g, 10, for very weak signals to high values, e.g. 210, for very strong signals. The RSSI value remains more or less constant throughout this range, irrespective of the selected gain setting, although receiver sensitivity increases or decreases based on the gain value applied. This linear response assists in localizing presence of instrumented animals and in calibrating multiple SRX1200 receivers that may require different gain values.

FREQUENCY ADJUSTMENT

Frequencies is adjusted/selected using the **Up** or **Down Arrows**. The amount of increment or decrement is also selected through SET Δ for frequency as described on Page 13.

When adjusting the frequency or gain manually during tracking sessions, the receiver will increase or decrease the frequency (kHz) or gain value based on the Frequency or Gain Delta increment selected.
Set **Frequency** increment via: **Set Delta > 1)Freq**
Set **Gain** increment via: **Set Delta > 2)Gain**

GPS DATA ACQUISITION

The GPS key enables access to acquire GPS fixes. GPS data can be stored by the receiver either in Monitor mode (manual process) or in Codelog mode (refer to applicable section). GPS fix should be verified before the enabling the GPS feature for a project (refer to Codelog Mode section Enabling/Disabling GPS Positioning), by initiating a scan through **Codelog Mode**. During test verification, ensure the GPS antenna is connected to the receiver and that the antenna has a clear view of the sky.

A GPS position is acquired by pressing the **GPS** key on the keypad (key number **4**). While attempting to acquire a position, the LCD screen displays the number of satellites as they are found.

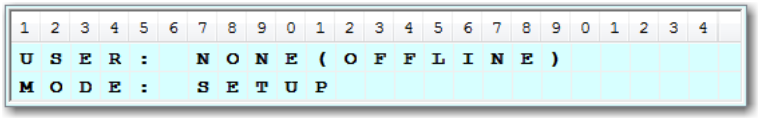
Once a valid position is acquired, the following information is provided on the display: Latitude, Longitude, current date, current GMT time, number of satellites used, HDOP, and PDOP. The display toggles back and forth, showing the Latitude and Longitude for four seconds and satellite, HDOP and PDOP information for two seconds. Either time or date is also displayed and updated every five seconds.

GPS cannot be used when the receiver is logged off. However, it is possible to log off from the receiver while the receiver is attempting to acquire a GPS position. When logging on, the display shows the results of the GPS position. Note that the CRTO (Continuous Record on Time-Out) is disabled with use of the GPS feature of the receiver.

Press the **END/ESC** key to discontinue acquiring collecting GPS fixes.

RECEIVER OPERATION

Upon start-up, the following screen display is typically presented. This screen is displayed when no-one is remotely logged on and the receiver is in its idle (or SETUP) state.

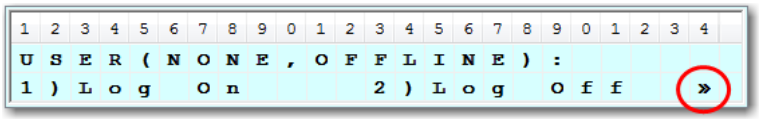


Logging On

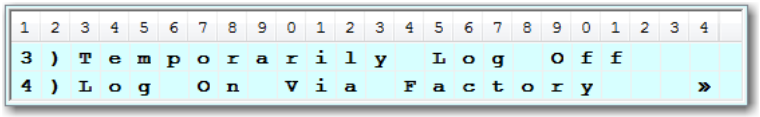
Logging on provides the ability to change the operational state of the receiver. When a valid 'log on' password is provided the receiver is considered Online. If no password is provided (logged off) the receiver is Offline. The differences between Online and Offline are described below: Offline: the receiver allows read-only access, which means most inputs are not allowed (unless a log on password is provided). The only allowed input is the Reset Password function.

Online: the receiver allows full write access, which means that all functionality and input capabilities are available.

There are a few options for logging on. This is a good time to talk about the arrow symbol circled in red, which will appear in the lower right of the display anytime when there are more menu options than can be displayed on a single view.



To access these extended displays, press the right arrow button, also labelled "ENTER"/. The left arrow button labelled "BSPACE" will move backwards to the previous display. The next display (as in example below) shows the result of pressing the right arrow key. Note that there is still a right arrow key displayed, meaning there are additional nested screen options to display.



Log on to the receiver as follows:

Press LOG ON key

1)Log On 2)Log Off

Select/press '1' key and 'Log On' using default Factory password "123456"

Wait a few seconds for changes to be accepted, at which point the receiver will return either to its last active state, e.g. monitor, or the start page. Logging on via the default password allows you to log on quickly, provided the factory password ("123456") is being used. This feature is convenient if you do not need or want a confidential password. Logging on can be done at any time during operation of the receiver, except when using the **Info** key and its menu items. If the default factory password represents the active password, users can use a quick key log on method by sequentially pressing the LOG ON and 4 key.

Logging Off

Logging off can be done at any time during receiver operation. Data collection can continue while limiting access to settings password. Logging off means the receiver is Offline.

Log off from the receiver as follows:

Press LOG OFF key

Log On 2)Log Off

Select/press '2' key or 3 key as below

Log On > 3)Temporarily Log Off

Once the receiver accepts the changes, the display returns to the start page (the first screen shown after the receiver is turned on). Temporarily logging off creates a restriction, whereby logging on is accessible only from the receiver keypad and is no longer accessible from the SRX Host software, except via the Host Keypad Simulator.

Changing/Resetting Password

Changing the log on password can only be performed in **Setup Mode and when** the receiver is Online. Changing the password requires that the old password be entered, followed by the new one. The receiver automatically places a slash [/] between the two passwords as they are entered. The password must consist of six numbers.

Change the password via:

Setup > 3)Change Password

Resetting the log on password can only be done in **Setup Mode and when** the receiver is Offline. This feature is not normally used, except to provide a recovery mechanism if the current password has been lost or forgotten. Should this occur, contact Lotek support staff, provide the receiver serial number and a six-digit number a password will be provided to enable access to the Reset Password function to log on to the receiver as follows:

Reset the password via:

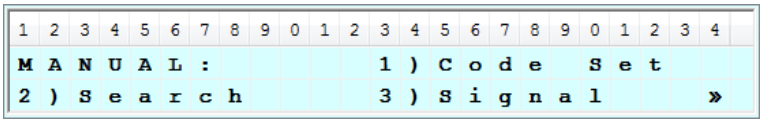
Setup > 3)Reset Password

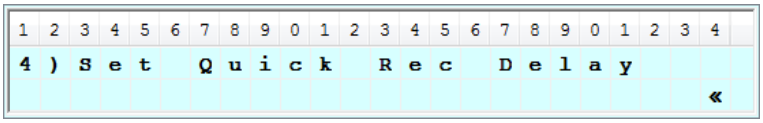
MANUAL MODE

Manual mode refers to those receiver states in which the user must fully specify and dynamically modify receiver parameters, e.g, frequency, gain, in real time, and optimize operation based on local ambient conditions to improve detection probability. Any changes to these settings are performed using the keypad.

During operation in Manual mode, data are not automatically logged by the receiver. Detected signals are displayed on the LCD screen and are audibly discernible from the speaker. Adjust the volume as required using the OFF/VOL knob.

After pressing the **Manual** key on the keypad, four menu items are presented:





1) Code Set This selection is used if the user intends to track and or log transmissions from digitally encoded Lotek transmitters. The user selects from a list of code sets that have been installed in the receiver. Three Code Set options are presented. Select **1) Code Set** and use the keypad to select or change the active code set. **Ensure that the Code Set you have selected corresponds with the code set programmed for your tags.**

2) Search and 3) Signal menu items provide alternate methods of scanning and changing settings that affect operation in manual mode. The Settings listed below are common to either 'Search' or 'Signal' selection:

- Start a scan- launches the search through the sequence of specified frequencies based on gain, frequency and step values entered.
- Define the type of transmitter to scan (Beeper/ID/Sensor)
- Define/Change the Set Delta frequency and/or gain
- Acquire a GPS position
- Enter a gain value
- Set the noise threshold

In search mode, the user may specify a start and end frequency, a step size and a step delay and the receiver will sweep through that range of frequencies, stopping at each step for the specified amount of time.

Settings unique to 'Search' include:

- Pause/ Resume a scan
- Enter a minimum frequency
- Enter a maximum frequency
- Define frequency step
- Set the scan time

Settings unique to 'Signal' include:

- Change antenna port assignment for the master radio antenna
- Change the radio frequency

4) Quick Rec Delay

This feature enables users to define a delay period during which the receiver will record detected transmitted tag signals. The Quick Record Delay window is entered as a 2-digit value in seconds. Selecting a 2-digit

window, e.g, 30s, requires that a '0' first be entered. The default value is 30s.

CODELOG & MONITOR MODE

The key labeled **"CODELOG",** or numeric key "2", accesses the features of the receiver that deal with data collection and the receiver configurations that determine how data is collected OR monitored. This is encompassed in a receiver mode referred to as CONFIGURED SCANNING, in which the receiver will operate based upon a preset user-configured scanning routine.

SRX1200 receivers configured exclusively for Mobile tracking operation (M-1 and M-2 models) will access **MONITOR** mode functions when the **CODELOG key** is pressed. Receivers configured for both Mobile tracking and datalogging, e.g., MD-2, MD-3, MD-4, operation have access to additional features nested under **CODELOG** mode as further described in this section.

Both '**CODELOG**' and **MONITOR** mode represent an operational state in which the receiver will auto-scan based on preconfigured parameters defined by the user. The primary distinction between the two modes is that scanning under '**CODELOG**' mode enables continuous and autonomous data collection during auto-scanning operation (applicable to MD and D receiver models). Additional features more applicable to long term autonomous system deployment, e.g., multi-antennas, data compression and signal processing options, are likewise available.

An extensive list of features are accessible through the Codelog function key, which allows entry and navigation through a hierarchy of nested and configurable options based on the receiver model purchased and corresponding feature suite specific to that model. The hierarchy of user configurable parameters with applicable by receiver model is presented on page 18. Detailed descriptions of these parameters follow.

CODELOG/MONITOR CONFIGURABLE CHART CONFIGURABLE PARAMETER CHART

Feature	SRX1200 Model						
	M1	M2	MD1	MD2	SRX-D1	D-2	D-3
Keypad and Display	■	■	■	■			
Mobile tracking	■	■	■	■			
Padded Carry Case		■	■	■			
Pelican™ Case Housing					■	■	■
Bandwidth	12MHz	12MHz	12MHz	26MHz	1MHz	12MHz	26MHz
Sensor support[1]		■	■	■			■
Autonomous Datalogging			■	■	■	■	■
Internal battery power	■	■	■	■			
Antennas	1	1	1-8	1-8	1-4	1-4	1-4
Coded Frequencies (Chan)	5	128	5	128	1	5	128
Beeper frequencies (Chan)	20	128	20	128	N/A	20	128
Memory Size			64MB	128MB	32MB	64MB	128MB
Max. Event Record Capacity			16	32M	8M	16	32M
GPS Clock & Position		■	■	■	■	■	■
Code ID & Channel Filter		■	■	■		■	■
Monitor Mode		■		■			
CRTO function			■	■	■	■	■
AGC function			■	■	■	■	■
TOA function			■	■	■	■	■
ON/OFF Scheduler							■
Remote Terminal Control				■	■		■
Multi-codeset scanning				■	■	■	■
Remote Notification				■			■

CODELOG CONFIGURABLE PARAMETERS

MONITOR MODE

1)Config (#1) 2)Start 3) Master FTable

1)Config The SRX1200 allows the user to designate up to 8 configurable receiver parameters that determine how the receiver will monitor frequencies of interest and or how data will be collected. Configurations presents a method for creating and storing recurrent project parameters, e.g., frequencies, scan cycle period, antenna scanning, noise blanking, gain, used in a project. Parameters can be entered into the SRX1200 Host software for upload to your SRX receiver.

The ability to pre-configure and store such parameters is also very useful in the event receiver(s) will be used concurrently in several projects. A user simply selects the corresponding number (1-8) to configure the receiver to operate based on the parameters previously entered for use in their project. It is recommended (for ease of entry) that all settings for a configuration be initially set up through the SRX Host software, then added to or amended through the receiver keypad.

2)Start Initiates an automated scanning routine based on the preconfigured parameters entered and for selected configuration (as described above). While auto-scanning in 'Monitor' mode, the 'Setup/0' key serves as a 'Pause' function, to allow users to temporarily suspend scans preconfigured scanning operations, Once stopped, the F up and F down buttons will not enable travelling through the frequency table (as it is the case in code-log), but will temporarily alter the frequency.while continuing to monitor detections of interest. Pressing the 'Setup/0' key resumes the preconfigured scanning operations.

CODELOG MODE

1) NEW CFG

The 'Config' feature is further described under 'Monitor Mode' on Page 18. When a scan cycle is started Codelog or Monitor mode, the receiver applies and operates based on the defined parameters in the active configuration. Data collected using the active configuration are saved to the receiver's flash memory. Some parameters cannot be edited in the

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

active configuration once data has been collected, as data in the receiver flash memory references the applicable frequency table and its specific channel assignments. The receiver does not permit entries in an existing frequency table to be changed if there is data in the receiver's memory until data is has been safely downloaded then erased from the receiver's memory via:

Codelog > 2)Scan > 2)Del all data).

The exception to this condition is that a new frequency can be added to the frequency table. It is also possible to remove a frequency from a frequency table as the master table remains unaffected.

Select a configuration via:
Codelog > 1)Config > 1)NewCFG

Enter the number of the desired configuration (between 1 and 8).

SCAN SETTINGS

Code Set selection

Digitally encoded or 'coded' Lotek tags transmit four pulses with the individual tag signature defined by the three intervals within the transmission 'burst' of these pulses. Every transmitter is assigned a unique code so that it and any sensor data associated with it can be identified by the receiver.

Scan Time

A Scan Cycle is the time required for the receiver to scan through all frequencies and at all antennas in the specified scan order. The time period for the selected scan cycle will depend on the number of frequencies and antennas to be scanned and the interval between tag transmissions (typically expressed as either beat rate for beeper tags or burst interval BI for coded tags). Frequencies and antennas are scanned in the order in which they are entered into the receiver and is referred to as the Scan Order.

The only conditions that can terminate a scan cycle are stopping data collection, battery failure, or if available memory is filled to capacity. A scan cycle can be temporarily suspended through use of pause and resume feature

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Calculating Total Scan Time

Use the equation below to calculate the Total Scan Time value.
((A x B) x C = Total Scan Time (seconds)
where:
A = number of radio frequencies
B = number of receiver antennas (including the Master)
C = scan time (seconds)

If a total scan time is not set (left as 00:00), the receiver immediately begins another scan cycle once its scan routine is complete. If the total scan time set is less than the calculated total scan time, the value entered is ignored and the receiver treats it as if no total scan time was set. The receiver can also be set up to wait until the total scan time has elapsed, prior to initiating another scan cycle. Setting the total scan time allows multiple receivers to synchronize scan cycles. It is also a power-saving option as the receiver shuts down all antennas and lowers gain while awaiting completion of the total scan time entered.

TOA

Use of Time-Out on Acquisition (TOA) and Master Antenna Preview can also affect Total Scan Time, which is the *maximum* time period to a complete a scan cycle. TOA can be enabled or disabled. With TOA enabled, the receiver monitors each frequency and antenna combination until the first valid detection, thus reducing total scan time.

TOA can therefore be used to minimize the amount of time it takes for the receiver to scan all of the available frequencies and antennas. This is not always a desirable result because it can result in lost data by ending a scan time prematurely, before other transmitters in the area can be detected on that frequency and antenna combination.

Example: With TOA enabled, and scan time set to 20 seconds, the receiver detects a valid signal after 6 seconds. The receiver is monitoring frequency A and antenna E when a detection occurs. Upon detection, the receiver stops scanning frequency A and antenna E and moves to the next frequency and antenna (depending on the scan priority selected).

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

CRTO

CRTO (Continuous Record Time-Out) can be used to conserve memory space. Enabling CRTO allows the receiver to track the number of valid detections for each transmitter ID at a specific frequency and antenna over a fixed time period (CRTO Window). The CRTO Window is defined by the CRTO Timeout as described below.

Upon completion of the user-defined CRTO Window, the receiver stores a single record for each individual transmitter received. The record uses this format: **Transmitter X on Frequency A and Antenna E was detected N times with an average Signal Strength of S**. The CRTO 'counter' then resets to begin a new storage window. If detected event(s) are from sensor transmitter(s), an average value of sensor data for each tag detected during the CRTO Window is provided. The CRTO Timeout specifies the amount of time the CRTO Window is open. The timeout value can be set from 1-99 minutes. The longer the timeout, the fewer stored records for each detected transmitter.

Use of the CRTO feature is application specific, but can be particularly useful in applications where there is a high probability that numbers of tagged animals will hold for extended periods in a particular monitoring site and or if extended periods between sites visits for data download are anticipated.

Note: With CRTO enabled, Adaptive Gain Control (AGC) is disabled, as gain must be fixed for the duration of the window. With CRTO enabled, the GPS positioning feature receiver is likewise disabled, although the GPS clock remains functional.

AGC

(Adaptive Gain Control) optimizes receiver performance by dynamically adjusting antenna gain settings. AGC is a useful data logging feature to assist in compensating for periodic changes in local ambient noise conditions. Applicable instances may include compensating for peak turbine activity periods at a hydro dam, or fluctuations in traffic conditions to a nearby fixed receiver station. With AGC enabled, the receiver dynamically adjusts gain to counter these local noise events, then returns to the original gain setting value, once it senses the noise events have diminished.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Enable or disable AGC via:

CodeLog > 1)Config## > 2)Scan Settings > 3)Options > 3)AGC

With AGC enabled, CRTO cannot be used, as gain must be fixed for the duration of a data record window.

GPS Clock

With the GPS clock the receiver can record and timestamp detection event with a time resolution than when disabled. When enabled, the GPS clock becomes active for five minutes every three hours and so updates the receiver clock. The cycle repeats throughout scanning in codelog mode. During a scan, the display flashes the letter **G** to indicate that the GPS clock is enabled.

Enable or disable the GPS clock via:
CodeLog > 1)Config## > 2)Scan Settings > 3)Options > 4)GPS > 1)En/Dis GPS Clk

The first line in the display shows the current setting and updates accordingly when **1)En/Dis GPS Clk** is selected.

The GPS clock must be enabled for the GPS positioning feature to function. Enable or disable the GPS positioning feature via:

CodeLog > 1)Config## > 2)Scan Settings > 3)Options > 4)GPS > 2)En/Dis Position
The first line in the display shows the current setting and updates accordingly when **2)En/Dis Position** is selected.

Site Number

The Site Number is a four-character numeric code that provides a method to identify/ differentiate study sites.

Enter a site number via:

CodeLog > 1)Config## > 4)Site Number

2) FREQ/CH

The SRX1200 scans frequencies according to how they are configured and entered into the receiver. Several parameters related to frequency need to be defined prior to operating in Codelog Mode, described as follows:

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Frequency Table

A Configuration Specific Frequency Table is a group of frequencies assigned to a specific configuration. Each of the eight possible 'Configurations' (as earlier described) can contain from a single to up to 128 frequencies. From this point forward, the Configuration Specific Frequency Tables are referred to as "frequency tables".

When a scan cycle is started, the receiver scans the frequencies in a table in the order they were entered. A frequency table is not active until a configuration using that frequency table is selected.

All frequencies in all frequency tables are copied into the master frequency table, although the master table cannot contain frequencies that reference the same channel number, or frequencies separated by <1kHz.

Adding a Frequency/Channel

Enter a frequency into the receiver via:

Codelog > 1)Config## > 3)Freq/CH > 1)Add > 1)Radio

The screen will prompt for a frequency to be entered. The decimal point is not automatically provided. Use the decimal key. Once the entire frequency value has been entered, the display automatically proceeds to the Set Ch# (set channel number) page. Enter a number for the channel to be assigned to the frequency entered. Assigning a channel number provides an easy way to reference frequencies.

Once a channel number is entered, press the **ENTER** key to apply the changes. Continue to add frequencies and channels in this manner. Frequencies cannot be changed through the keypad once added, only deleted or disabled.

Deleting a Frequency/Channel

A frequency can be deleted from a frequency table via:

Codelog > 1)Config## > 3)Freq/CH > 2)View/Modify > 1)Del

Note: as frequencies in a frequency table are also copied into the master table, they can be deleted from individual frequency table but still appear in the master table.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Enabling/Disabling a Frequency/Channel

Individual enabled frequencies in a frequency table are available for scanning. Disabled frequencies are not scanned. During a scan, a frequency can be temporarily removed from the scan cycle until needed again. By default, frequencies entered are considered to be enabled.

Enable or disable a frequency via:

Codelog > 1)Config## > 3)Freq/CH > 2)View/Modify > 2)En/Dis

The LCD indicates that the frequency is enabled or disabled by showing EN or DIS after the selected frequency.

Assigning a Transmitter Type

Transmitters must be assigned as beeper tags (BPM), Coded tags (ID) or as Coded Sensor Tags (SEN). Unless otherwise specified, the receiver defaults to ID-only for new frequency and channel assignments.

Assign a transmitter type to a frequency and channel via:

Codelog > 1)Config## > 3)Freq/CH > 2)View/Modify > 3)ID/BPM/Sen

The display shows the current setting for the frequency (e.g. 149.891MHz CH456 EN ID), which includes the frequency, the channel, whether the frequency is enabled or disabled and the transmitter type. Pressing the '3' key toggle the tag type selection the appropriate designation for the transmitters in use on the specified frequency.

Assigning Tags as Beepers (BPM) presents an arrow key. Pressing the arrow key presents the following screen menu.

4)All Wnd 5)↑F 6)↓F

7) Wnd1 8) Wnd2 9) Wnd3

Use the arrow keys to move to the next frequency in the frequency table to enter the correct transmitter type.

Master Frequency Table

As frequencies are entered, they can be viewed in the Master Frequency Table as follows:

Codelog > 3)MasterFtable > 2)View Master Ftable

Use the **Right** and **Left Arrow** keys to move forward and backward through the list. The display provides the frequency and channel, as well as which configurations use that frequency and channel.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

3) ANTENNA (ANT)

Radio antenna selection can range from simple whip antennas and two-element (H) Yagi antennas common to mobile tracking telemetry applications, to multi- (3-9) element Yagi antennas often selected for use in autonomous datalogging applications. Typically, antenna gain and directivity increase as the number of antenna elements increases. Antenna selection represents an important application specific consideration in telemetry projects to optimize overall system performance.

Depending on application requirements and receiver model selection, an SRX1200 system can accommodate up to eight antennas. Single antennas connect to the BNC connector on the front receiver panel (as shown in SRX Layout on Page 7). This antenna/port is designated as **A0.** SRX1200's can also be connected to (optional) ASU-2 devices to switch between two antennas, as commonly used in tracking applications from aircraft. An ASP-8 external switchbox peripheral device can also be connected to SRX1200s (model dependent) to monitor multiple (up to 8) antennas for autonomous datalogging applications. Connections to the ASP are referred to as Antenna Ports and are associated specific Port Numbers. SRX1200D receivers have antenna switching for up to four antennas integrated into its design.

Antenna-related parameters must be defined as follows prior to data collection:

- **Add antennas** to an antenna group.
- Enter a **gain** value for each antenna.
- Enter an **Antenna Port** number for each antenna.
- Set the receiver to use the ASP-8 or the ASP_4
- (optional) Designate a radio antenna as a master.
- (optional) Assign a **Frequency** or an **Antenna Priority** for the scan cycle.
- (optional) Enable **Master Antenna Preview.**

Antenna Groups

The SRX can provide the user with several monitoring options at which the receiver will scan through antennas including; sequential monitoring, as well as Master/Slave antennas scanning based on Grouping antennas. In an eight-antenna configuration for example, if antennas are connected to antenna ports 1,2, 4, and 6, this is referred to as the Group.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Adding Antennas

Antennas must be added in the order in which they are to be scanned (scan order). For example, the group may be connected to antenna ports 1, 2, 4, and 6, but if they are entered into the receiver in this order: 4, 2, 1, and 6, then that is their scan order.

Add an antenna to a group via:

Codelog > 1)Config## > 3)Ant > 1) Ant Grp

The type of antenna must be selected first. Selecting **3)Ant** proceeds to the Antenna Group page

Antennas are added using antenna port numbers. Available antenna port numbers are from 1 through 8. Following entry of each antenna port number, a slash [/] appears to separate the antennas being entered (e.g. 1/4/5/2/8/6). Press the **ENTER** key to apply the changes.

Designating a Radio Antenna Master

The master antenna designation is used to assign scanning priority to a particular antenna prior to scanning other radio antennas. Assignment of a master antenna, avoids the need to scan other antennas until a valid signal is detected by the master.

Master antennas are designated in one of two ways:

- One master per antenna group: Only one master is associated with each group. For example, a radio antenna on Antenna Port 2 can be assigned as the Radio Antenna Master and a hydrophone on Antenna Port 8 can be assigned as the hydrophone master.
- All antennas are master antennas: when an antenna group is defined as the master antenna, then all the antennas in that group are activated simultaneously (that is, their inputs are summed by the ASP-8). For example, if the Radio Group that uses antenna ports 1, 2,
- 4, and 6 is designated as the master, then all antennas in that group are scanned simultaneously.

Assign a radio antenna as the Radio Master Antenna via:

Codelog > 1)Config# > 4)Ant > 3)Ant > 2)Radio Master Ant

Three entry options are possible:

- Enter the value as **0** (zero) to make all radio antennas master antennas
- Enter a value from **1** through **8** to make a single antenna the master. The value entered corresponds to an antenna port number on the ASP-8.
- Enter the value as **9** to designate NO antenna as master

Once a value has been entered, the receiver returns to the menu selection page.

Assigning Gain Values

The ASP and all antennas must be assigned gain values. A typical starting gain value is 50, but an appropriate value should be set based on local ambient noise conditions and study objectives.

Front Panel Port (A0) gain values to each antenna via:

Codelog > 1)Config## > 4)Ant > 4)Gain > 2)A0 Gain

Assign gain values to each of the Antenna Ports on the ASP via:

Codelog > 1)Config## > 4)Ant > 4)Gain > 1)ASP-8 Gain

Enter the number of the antenna port to which the gain value will apply. The display then prompts for a gain value to be entered. Once the selected gain value has been entered, the display returns to the ASP Gain page. Following the ASP Gain title in the display a series of numbers is presented in brackets. These numbers reflect the current gain value settings that corresponding to the antenna port, listed in order from one to eight.

Scan Priority

Three scan priorities are available: **Frequency, Master Antenna Preview,** and **Antenna.** Antenna priority is independent of the other two, whereas Master Antenna Preview always applies 'Frequency Priority' first, then applies its defined rules to complete a scan.

Frequency Priority is used when the preference is to scan a single frequency using every applicable antenna, prior to scanning the next frequency in the selected frequency table. All valid detections of transmitters that occur during scanning are recorded. Unless Antenna Priority is enabled, Frequency Priority is enabled as the default scanning operation. Frequencies are scanned in the order in which they were entered (scan order).

Antenna Priority is enabled when it is preferable to scan through each of the designated frequencies in a frequency table at each individual antenna. All configured frequencies would be sequentially scanned at each antenna in the order in which they were entered.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Assign the antenna priority via:

Codelog > 1)Config## > 4)Ant > 5)Priority > 1)Freq/Ant

Toggling between **1)Freq/Ant** applies the corresponding priority to frequency or antenna.

The **Master Antenna Preview** feature allows the receiver to conserve power while awaiting a valid detection. Concurrent use of Master Antenna Preview with Total Scan Time affords further power savings (refer to Total Scan Time and TOA section).

At least one antenna (or group of antennas) must be designated as a Master Antenna to use Master Antenna Preview. After the first frequency to be scanned is determined (the first frequency in the frequency table), Master
Antenna Preview allows a priority to be assigned to that frequency on the appropriate Master Antenna.

When a Master Antenna is scanned, the receiver scans only the Master Antenna for the specified Scan Time until a valid detection is received. The receiver then scans all remaining antennas designated in an Antenna Group at the frequency on which the initial detection was received. When the scan is completed, the receiver scans at the next frequency in the frequency table.
If no Master is designated for a particular group, the receiver defaults to using Frequency Priority to scan the antenna group scanning at all designated antennas for the specified Scan Time prior to scanning the next next frequency in the frequency table… and so on.

All antennas in a Group can also be designated as Masters. With Master Antenna Preview enabled in this scenario, the receiver will simultaneously scan all antennas in the group until a valid detection is received. Once a valid signal is detected, the receiver then scans at each antenna in the group according to its assigned scan order.

Note that Master Antenna Preview is disabled when Antenna priority is enabled. Enable Master Antenna Preview via:

Codelog > 1)Config## > 4)Ant > 5)Priority > 2)En/Dis Master Preview

Toggling **2)En/Dis Master Preview** enables/disables the Preview setting.

ASP-8 When an ASP is to be connected to the SRX1200, set the receiver to use an ASP via

Codelog > 1)Config## > 4)Ant > 1)Use ASP8 > 7)Yes or 9)No.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

4) FILTERS

Received signals can be qualified for storage and display by using a set of filters. This section of the manual describes two filter classes. The first described filter set relates to signals (frequency/channel and transmitter ID) and the second to signal quality (signal strength and pulse timing).

ID Filter provides the ability to filter Channel (Frequency), coded tag ID combinations or IDs only without altering the Configuration's frequency table. IDs or Channel plus ID combinations can be accepted or rejected by creating accept or reject lists, each of which with up to 100 entries.

Four such filter types are available, although only one filter type can be activate at a time. Once the filter type is selected, the receiver applies the filter type settings to the list created.

Select the filter type via:

Codelog > 1)Config > 5)Filters > 1)ID Filter

Four options are available:

1)No Filter, 2)Reject Ch/ID, 3)Accept Ch/ID, 4)Reject ID 5)Accept ID

No Filter is self-explanatory.

Reject CH/ID allows a list of Channel plus tag ID combinations to be created that will be rejected during a scan. All Channel plus tag ID combinations added to this list are rejected (conversely all combinations not in the list are accepted). Any valid detection on the specified Channel plus ID combination list are *not* recorded by the receiver or displayed on the screen.

Add a Channel plus ID combination to the reject list via:

Codelog > 1)Config > 5)Filters > 1)ID Filter > 2)Set Reject Ch/ID >1)Add

Enter the channel followed by the ID. The display automatically inserts a slash [/] between the two values as they are entered. The number in brackets in the first line of the display corresponds to the entries in the list (e.g. entry #33 in the reject list).

Any entry in the reject list can also be viewed and deleted. View an entry via:

Codelog > 1)Config > 5)Filters > 1)ID Filter > 2)Set Reject Ch/ID > 2)View/Del

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

The first entry is shown in the first line of the display. To view the next entry, use the **Right Arrow** key to advance through the list. An entry in the list can be deleted at any time by pressing the 1 key (1)Del).

Accept Channel or ID allows a list of Channel plus tag ID combinations to be created that are to be accepted during scanning operations. All Channel plus ID combinations added to this list are accepted. Any detection at the specified Channel /ID combination in the list are recorded by the receiver and displayed.

Add a Channel plus ID combination to the accept list via:

Codelog > 1)Config > 5)Filters > 1)ID Filter > 3)Set Accept Ch/ID >1)Add

Enter the channel followed by the ID. The display automatically inserts a slash [/] between the two values as they are entered. The number in brackets in the first line of the display corresponds to the entries, e.g. entry #33, in the accept list.

Any entry in the accept list can also be viewed and deleted. View an entry via:

Codelog > 1)Config > 5)Filters > 1)ID Filter > 3)Set Accept Ch/ID > 2)View/Del

The first entry is shown in the first line of the display. To view the next entry, use the **Right Arrow** key to advance through the list. An entry in the list can be deleted at any time by pressing the **1** key [**1)Del**].

Rejecting or Accepting an ID only likewise allows a list of transmitter IDs to be created that will be rejected or accepted during a scan in the manner described above.

Add an ID to the reject list via:

Codelog > 1)Config > 5)Filters > 1)ID Filter > 4)Set Reject ID >1)Add

Add an ID to the accept list via:

Codelog > 1)Config > 5)Filters > 1)ID Filter > 5)Set Accept ID >1)Add

Any entry in a created list can also be viewed and deleted. View an entry via:

Codelog > 1)Config > 5)Filters > 1)ID Filter > 4)Set Reject ID > 2)View/Del

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Filters to define pass/fail boundaries based on selected characteristics of pulsed transmissions include:

Echo Filter allows a time period entry (in ms) following a valid detection, where any additional pulses within the specified period would be identified as signal echoes and ignored. The default value is appropriate for most applications.

Noise Threshold allows a minimum allowable detection signal strength value to be defined (to a maximum of 99). The value selected will depend on local ambient noise conditions at the study. Applying a noise threshold value reduces logging 'noise events' so improves receiver efficiency insofar as power, memory and processing time and can reduce data download and sorting time during post processing as fewer noise events will be logged. As the noise threshold adjusts the noise floor for acceptable detections, valid but weak detections at the boundary of reception may be lost depending on the value selected.

Pulse Width is defined through the SRX Host, and minimum Pulse Width filter threshold is typically set to 2ms. With the filter enabled, pulses with a measured pulse width less than the pulse width filter (e.g. 2ms) are ignored.

Enable or disable this feature via:

Codelog > 1)Config > 5)Filters > 2)Pulse Filter > 3)Pulse Width > 1)Enable **(or)** 2)Disable

The display shows the current setting in brackets using the number of the menu items available. For example, if pulse width filter is disabled, then the number in brackets is "**2"**.

Signal Strength Deviation applies to codes (sequences of pulses), and is used to reject codes whose individual pulses exhibit a large variance. This feature is useful for detecting code collisions, where two codes with different signal strengths have overlapped.

The maximum signal strength deviation is 18. Enable or disable this feature via:

Codelog > 1)Config > 5)Filters > 2)Pulse Filter > 4)Signal Strength Dev > 1)Enable (or) **2)Disable**

The LCD shows the current setting in brackets using the number of the menu items available. For example, if signal strength deviation is disabled, then the number in brackets is **2**.

Note: Use of filters can improve receiver efficiency and overall system performance. Setting inappropriate filter values can also result in loss of valid detections. The effect of any changes to filter settings on receiver operation should be verified during your system calibration procedures in advance of your project's start date.

5) SENSORS

Should the radio tags used in your project be equipped for transmission of coded sensor data, the appropriate Sensor Type must first be entered in the SRX1200 to enable data collection.

Four types of sensors are available: Temperature, Pressure, Motion/ Activity, and EMG. Up to three sensor types can be used concurrently by the receiver. For the receiver to interpret and display sensor data correctly, sensor range and deflection scale granularity must first be specified. These parameters are characterized by three numbers: Minimum and Maximum (measurement values) and Level (the number of measurement levels) and are typically included with the documentation that accompanies the transmitter shipment. If there is any question regarding the corresponding values for your tags, please contact Lotek.

Sensor Type

As coded sensor transmitters can combine up to three sensor types in a single transmitter, the receiver must be able to distinguish among the types.

Select the sensor types via:

Codelog > 1)Config > 6)Sensors > 2)Type

A maximum of three sensor types can be entered. The number of the selection corresponds to the menu item number. For example, press key **3** to select the Activity sensor type and the number 3 appears in the display. The display automatically places a slash [/] between each selection (e.g. 1/2/3). Once three selections have been made, the receiver returns to the Sensors page. If fewer than three selections are made, press the **Enter** key to apply the changes and return to the Sensors page.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

Entry of Sensor Type values is as described below:

Temperature

1. Set minimum temperature via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 1)C > 1)Min
2. Set maximum temperature via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 1)C > 2)Max
3. Set number of levels for temperature via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 1)C > 3)Level

Pressure

1. Set the minimum pressure via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 2)PSI > 1)Min
2. Set the maximum pressure via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 2)PSI > 2)Max
3. Set the number of levels for pressure via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 2)PSI > 3)Level

Activity and Motion

The SRX1200 receiver may be configured for Activity or Motion. Selection of the applicable setting will also depend on tag series/model[1] and codeset selection . The Motion sensor state is transmitted and or logged in a binary format, either active or inactive. Each Activity event transmitted and or logged reflects either a maximum or mean value of all the samples taken , e.g., 12Hz, 50Hz, 200Hz sampling rate, between each tag transmission, or the maximum or mean value relative to the log interval chosen to store Activity data. Activity level data are mapped relative to the deflection and sensitivity scales for which the sensor transmitters are programmed.

1. Set the minimum activity via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 3)Act > 1)Min
   This value is typically set to “0” (inactive/not moving).
2. Set the maximum activity via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 3)Act > 2)Max
   This value is typically set to “1” (active/moving).
3. Set the number of levels for activity via:
   Codelog > 1)Config > 6)Sensors > 3)Param > 3)Act > 3)Level

[1] The accelerometer-based 'Activity' option is specific to MCFT3-series transmitters.

CODELOG MODE CONFIGURABLE PARAMETERS (continued)

EMG Parameter
Set the minimum EMG value via:

1. Codelog > 1)Config > 6)Sensors > 3)Param > 4)EMG > 1)Min

2. Set the maximum EMG value via:

Codelog > 1)Config > 6)Sensors > 3)Param > 4)EMG > 2)Max

3. Set the number of levels for EMG via:

Codelog > 1)Config > 6)Sensors > 3)Param > 4)EMG > 3)Level

To change the sign of a value for any applicable parameters above, use the **+/-** key.

Sensor Data Display

Temperature can be displayed either in Celsius (default) or Fahrenheit. Pressure can be displayed in PSI (default) or meters (depth).

Changing the units for a sensor affects only the data display. It does not affect how data is recorded by the receiver. Data recorded by the receiver is always in the default units (Celsius and PSI).

Change the measurement unit for temperature via:

Codelog > 2)Scan > 1)Continue to log data > 2)View > 2)Temp, pressure units > 1)C/F

Change the measurement unit for pressure via:

Codelog > 2)Scan > 1)Continue to log data > 2)View > 2)Temp, pressure units > 2)PSI/m

The first line in the screen display updates to indicate the selected unit of measurement.

DATA DOWNLOAD

Please refer to the **SRX Host** manual for detail on how to download data through direct Serial, USB, or modem connections.

DATA RECORD FORMAT

Data record formats will vary depending on the user-specified settings in the active configuration (refer to the CodeLog Mode section for details on defining receiver configurations).

Three settings affect the format and size of each data record:

- CRTO enabled or disabled
- GPS 2D-position feature enabled or disabled
- Transmitter Type: ID Only or Sensors

While additional fields in a data record are needed to support CRTO, GPS, and Sensor data (or combinations of these), certain data fields are always provided:

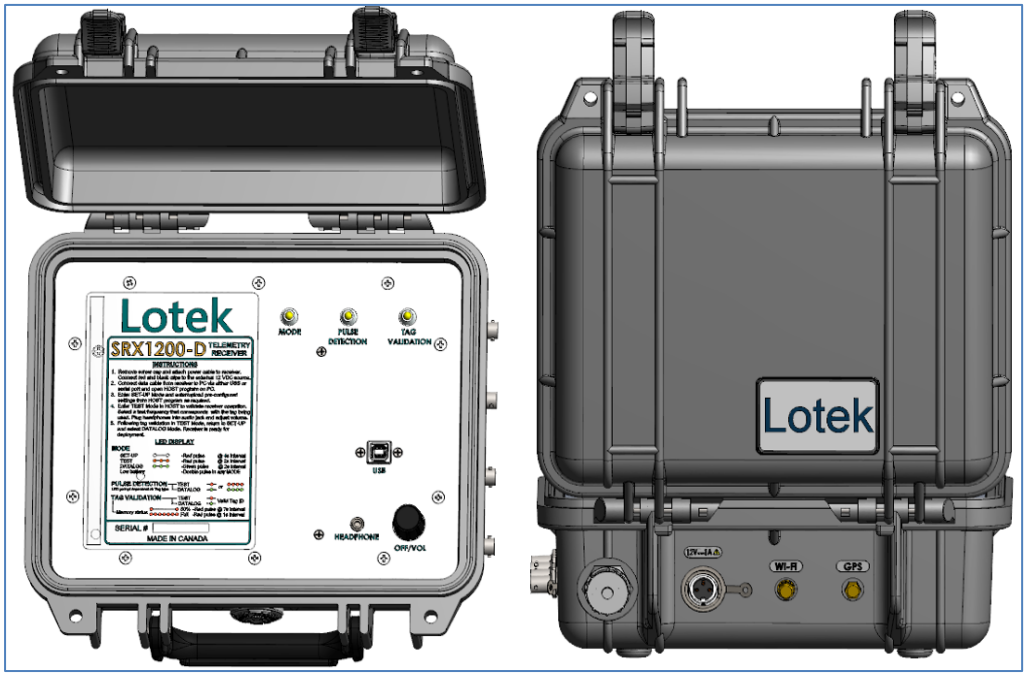
- Detection time (or start time and duration for CRTO records)
- Frequency
- Transmitter ID
- Antenna port number
- Signal strength

Data records also include 'Environment' Data. Environment data comprise all the settings that influence a Scan Cycle including:

- Master frequency table (frequencies and their channel numbers)
- Configuration-specific frequency tables
- Antenna scanning protocol, active ports and gain values
- Master radio antenna and antenna designations
- Total scan time value
- Scan time setting for active frequencies
- CRTO enabled or disabled
- AGC enabled or disabled
- Echo Filter time
- Code set selected

When the receiver begins collecting data, an Environment record is stored in the memory with a time stamp. Any subsequent changes to the settings are likewise stored and time-stamped to indicate when each change was m

SECTION II SRX1200D Receiver Series



TECHNICAL SPECIFICATIONS

Operating Voltage Range	9-16VDC (nominal 12V)
Operating Current	275 mA @12V
Weight	~2.3 kg
Size	~27 x 25 x 13 cm
Memory	32MB to 128MB
Storage Temperature range	-30°C to +55°C
Relative Humidity	95 %
Altitude Rating	2000 m
RF Parameters	
Operating Frequency Range	138-176 MHz
VHF Input Impedance	50 Ohm
Antenna Ports	4
Frequency Resolution	1 kHz
Frequency Stability	5ppm
Sensitivity	
Minimum discernible audio	-150 dBm
Minimum discernible by	-135 dBm

RECEIVER CARE, MAINTENANCE AND SERVICE

The SRX1200 D-Series data logging receiver is designed for extended autonomous operation under adverse conditions that can arise during research applications for which the receiver was designed. The SRX1200D receiver is contained within a watertight, corrosion and dust-proof, vented housing with "O-Ring" seals that secure using double-throw latches. Once (12vdc) external power is applied, the receiver is designed to operate with the housing lid securely closed for protection. LEDs on the top panel indicate functional status of the receiver and are used to assist during set-up. Once the lid is closed, LEDS are disabled to conserve power. SRX1200D series receivers are not designed for use in mobile/manual tracking applications that necessitate the housing/case remains open. During use in autonomous logging applications, avoid sealing receiver in small non-ventilated enclosures subject to wide daily temperature fluctuations. To maintain peak receiver performance and signal sensitivity, care during handling and transport is recommended.

- For basic cleaning, wipe the housing and front panel with a soft cloth using a mild solution of soap and water. Avoid use of solvents. Should protective rubber caps be removed for cleaning, avoid any allowing liquid to infiltrate into the receiver. Store in a cool dry environment.

- Always use ear-buds provided by Lotek (stereo plug, 30 Ohm speakers) to obtain audio signal via connection to the ear bud jack on the top panel port. Likewise, use only the GPS antenna (3V active antenna) and connection cables provided by Lotek. Avoid using any other power connection cable other than those shipped with the receiver, as pin-outs may differ.

- ***Do not attempt to remove the receiver top panel, as this may void your warranty. In the event your receiver appears to have a malfunction and fresh batteries have been correctly installed, contact and advise Lotek for additional support. As required, we will arrange to have your receiver returned for service.***

- ***Do not use the receiver outside specified conditions. Improper use may affect performance, damage the receiver and or affect warranty.***

SRX1200 D-Series Receiver Layout

TOP PANEL

1 - Magnetic Actuator to auto-disable LEDs

2 - Instructions for Operation Label

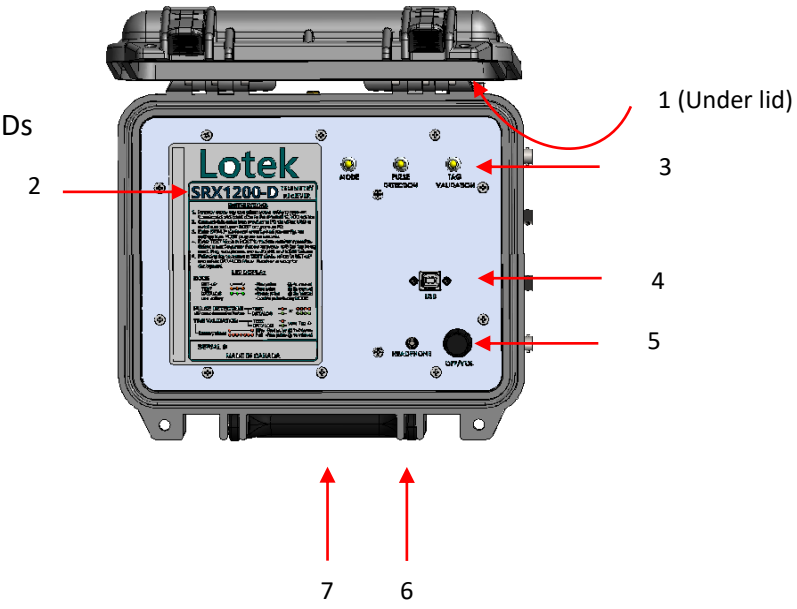
3 - LED Indicators

4 - USB Port Type B connector

5 - Power ON/OFF Volume Control

6 - 1/8” (3.5mm) headphone jack

7 - Pressure sealed Vent



SIDE AND BACK PANEL

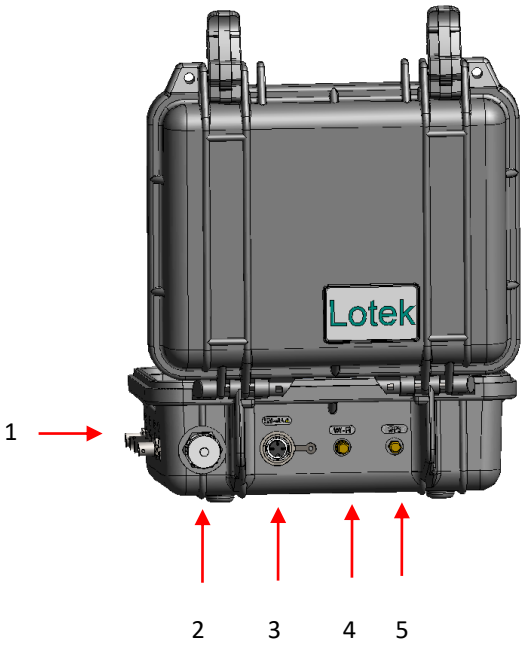
1 - 4 BNC antenna input Ports

2 - 12 VDC External Power connector

3 --USB Type A connector

4 - WiFi Connector

5 - GPS antenna Port



SRX1200-D Model Description

The SRX1200-D is designed to be externally powered from a 9-16VDC supply source for autonomous data collection of either VHF beeper or Lotek coded transmitters. Three receiver models are available with distinguishing features as shown below. All SRX1200D models support GPS clock synchronization and scanning at up to four antennas. Operation and set-up of the GPS and antenna scanning are as described under Section I, Page 13 as well as under the included HOST Software Guide.

SRX1200 HOST Software

The Windows based PC HOST software used with SRX1200D receiver models is common to all SRX1200 receivers, though certain features are models specific. Install the HOST software using the installer. Once the installer is run with the host PC linked to the receiver will automatically detect the applicable SRX1200 model.

Use of HOST software to configure operational parameters of the receiver during data logging operations is detailed in the SRX1200 HOST manual. Descriptions of the configurable parameters mirror those described under SECTION I of this Guide under `CODELOG CONFIGURABLE PARAMETERS, although as SRX1200D receiver models do not have a keypad, access to these features to configure and define receiver operation in set-up mode , e.g., frequencies, antennas, scan cycle time, must be entered via HOST.

Power

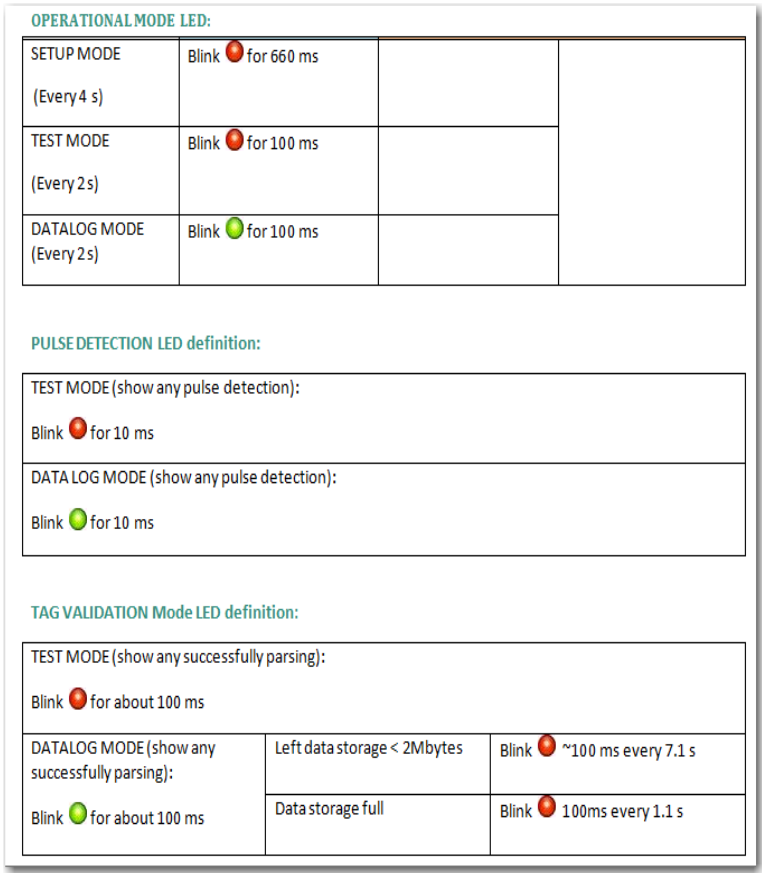
SRX1200-D receivers are designed for connection to an external 9-16V DC power source for autonomous data collection, using the power cable provided. The red alligator clip is to be connected to the positive terminal and the black clip to the negative terminal. Although the receiver is protected against over-voltage and polarity reversal in the event external power is misconnected, it is recommended that correct polarity connection be verified prior to attempting to turn the receiver on.

A 12VDC deep cycle RV or car battery, typically used as an external power source, may in turn be connected to a regulated system, e.g., solar panel(s), wind generator, to trickle- charge the battery and thereby avoid periodic site visits to exchange batteries. Note that the receiver is designed to operate from a trickle-charged battery, rather than directly from the trickle-charge system selected.

VHF Antenna Connectors

The SRX1200D supports antenna switching using up to four individual BNC VHF antenna ports labeled A1, A2, A3, and A4. Antennas may be designated as Masters and may be monitored[2] either sequentially or simultaneously[3], depending on application requirements. Antenna and cables with 50 Ohm impedance are recommended to ensure proper receiver matching. When not in use, ensure the connector caps attached to each antenna connector port by a short chain are securely fastened to the antenna connector, to prevent water from breaching the enclosure and potentially damaging the receiver.

FRONT PANEL LED DISPLAY



OPERATIONAL MODE LED:

SETUP MODE (Every 4 s)	Blink for 660 ms		
TEST MODE (Every 2 s)	Blink for 100 ms		
DATALOG MODE (Every 2 s)	Blink for 100 ms		

PULSE DETECTION LED definition:

TEST MODE (show any pulse detection): Blink for 10 ms		
DATA LOG MODE (show any pulse detection): Blink for 10 ms		

TAG VALIDATION Mode LED definition:

TEST MODE (show any successfully parsing): Blink for about 100 ms		
DATALOG MODE (show any successfully parsing): Blink for about 100 ms	Left data storage < 2Mbytes	Blink ~100 ms every 7.1 s
	Data storage full	Blink 100ms every 1.1 s

Logging Mode When the SCAN) Mode is active, the SRX800-D detects codes and logs code records. It is possible to request that raw detection reports be sent to the Host in Real Time, as they are being detected. Operation of the Real-Time Viewer is detailed in the HOST Manual.

SET-UP Mode- In SETUP Mode, the receiver is not monitoring the channels and not logging data. The receiver is in a state where it can accept changes in its configuration, as well as requests to erase data memory. Settings that can be accessed include:

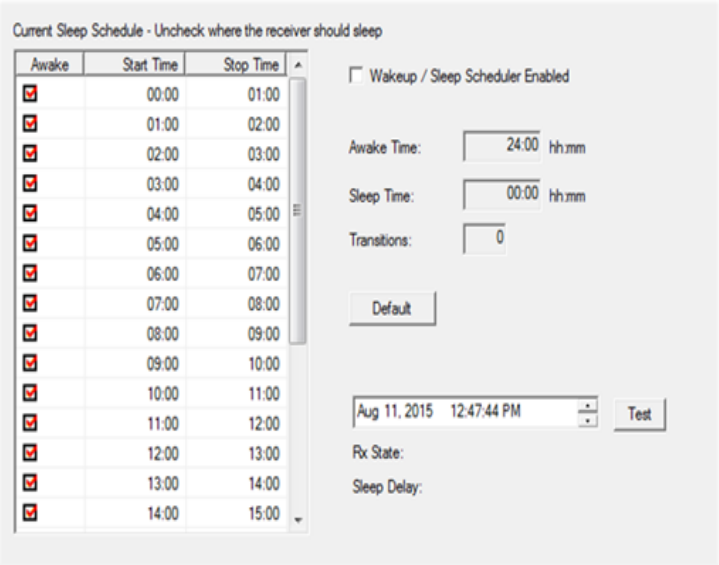
- Serial port setting
- Serial port setting
- System Access Password
- Real time clock
- Scan settings and rules
- Frequency / Channel Table
- Antenna Port Configuration

Sensor / Channel Assignments.
Operation of each selectable parameter is as detailed under Section I and in the HOST manual.

TEST Mode- is a special mode whereby the receiver can be directed to monitor a specific frequency at a specific antenna gain value. While in TEST Mode, the receiver is monitoring a single frequency but it is NOT logging detections in memory. Instead, it reports detection directly to the Host.
Launching the Test Mode in HOST presents the user with a menu to select a Frequency, Gain setting and Antenna to be configured and tested to ensure transmitter operation and to assist in system calibration.

[2] Antenna switching selection can affect scan cycle time, as well as overall system sensitivity. For example: sequential monitoring at individual antennas can increase scan time and optimizes system sensitivity relative to combining all antennas in a single antenna configuration for simultaneous monitoring.

Wake Up Sleep Utility



The Wake Up Sleep feature is a scheduling utility that allows the user to define start and stop (on/off) periods of operation for the receiver over a 24 hour cycle period with one hour interval resolution (as shown). In its stop or off state, no monitoring or data logging activity occurs. This conserves power, so extending mission life to battery exchange which is the utilities primary purpose. Once the pre-configured start time is reached as defined by the 24hr cycle period, the receiver resumes scanning operations based upon its active configuration. The scheduler also includes an 'override' feature that is triggered whenever a user connects to the receiver's USB port. This is useful for example, when a client arrives at a receiver site to check receiver status during a scheduled inactive period. In such situations, the receiver becomes active upon USB connection and remains accessible throughout the period in which there is a direct connection. Once disconnected, the receiver will re-enter its pre-configured state after approximately two minutes and resumes operations based on its 24hr cycle period.

APPENDIX A: ADDITIONAL INFORMATION

Annexe A: Information Complimentaires

A. This device complies with FCC Part 15 and Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux normes FCC partie 15 et Industrie Canada exempts de licence (s) standard RSS. Son fonctionnement est soumis aux deux conditions suivantes:

(1) cet appareil ne peut pas provoquer d'interférences, et

(2) cet appareil doit accepter toute interférence, y compris celles pouvant causer un mauvais fonctionnement de l'appareil.

B. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help.

C. This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

D. The external WiFi antenna, for both the SRX1200 and SRX1200-D receiver models, must be installed to provide a separation distance of at least 20 cm from all persons.

L'antenne WiFi externe, pour les modèles de récepteurs SRX1200 et SRX1200-D, doit être installée pour fournir une distance de séparation d'au moins 20 cm de toutes les personnes.

WARNINGS

Changes or modifications not expressly approved by Lotek Wireless Inc. could void the user's authority to operate the equipment.

MISES EN GARDE

Les changements ou modifications non expressément approuvés par Lotek Wireless Inc. peuvent annuler le droit de l'utilisateur à utiliser l'équipement.