Seismic Source

Quick Start Guide

BoomBox 3 Autonomous Quick Start Guide

January 2018

Version 1.2

Seismic Source Co.
2391 East Coleman Rd.
Ponca City, OK 74604
USA
Telephone: (580) 762-8233
Fax: (580) 762-1785

Email: mail1@seismicsource.com
www.seismicsource.com

Printed in U.S.A.

©2017 Seismic Source Co. • All rights reserved.
This document may not be reproduced in any form without prior express written consent from Seismic Source Co.

Seismic Source reserves the right to make changes and improvements to its products without providing notice.

Document Revisions

Date	Version Number	Document Changes	Author
08/25/2017	1.0	Initial Draft	Mark Day, Kyle Benton
09/01/2017	1.1	Additional Information	Andras Feszthammer
1/8/2018	1.2	Autonomous Mode Setup	Mark Day

Table of Contents

1 Web Interface Overview 6

1.1 Connecting to a Unit via Web Interface *6*

1.2 Autonomous Mode Setup *7*

1.2.1 Setup Through Web Interface 7

1.2.2 Setup Through SourceLink 8

1.3 Assigning the Next Shot *9*

1.3.1 Assigning Next Shot Manually 9

1.3.2 Assigning Next Shot Automatically 9

1.3.3 Communication Status 9

1.3.4 Map & GPS 10

2 Importing/Exporting with Direct Connection 11

2.1 Loading Source Points into the Boom Box 3 ..... *11*

2.1.1 Source Points Setup 12

2.2 Loading Shots from Boom Box into SourceLink *13*

3 Importing/Exporting via Web Interface 14

3.1 Exporting SP1 from SourceLink to Web Interface *14*

3.2 Importing SP1 into the Web Interface *14*

3.2.1 Importing SP1 files onto an Android Device 14

3.2.2 Importing SP1 files onto an iOS Device 15

3.2.3 Importing SP1 files into the Web Application 15

3.3 Importing Shots from Web Interface to SourceLink *16*

3.3.1 Download CSV from Web Interface 16

3.3.2 Upload CSV to SourceLink 16

3.4 Importing SPS/SP1 into SourceLink *16*

3.4.1 Importing SPS file into SourceLink 16

3.4.2 Importing SP1 file into SourceLink 17

4 Autonomous Decoder Operation 19

4.1 General Autonomous Decoder Operation *19*

4.2 Detailed Autonomous Decoder Operation *21*

4.2.1 Uphole Geophone Resistance Test 21
4.2.2 CAP Resistance Test 21
4.2.3 GPS Test 21
4.2.4 Fire Sequence -Autonomous Decoder 21

1 Web Interface Overview

This section provides a brief overview of the various features of the Boom Box 3 Web Interface. The BB3 Web Interface can be used to:

- Load Operating Parameters
- View Uphole Data
- View Status of the Resistance Test
- Load and Store all Uphole Information from Boom Box 3

The Web Interface requires no installation as the built in Wi-Fi Interface of the Boom Box 3 can communicate with most Web Browsers (Internet Explorer, Safari, Google Chrome, etc.) in most common cell phones, tablets and computers with Wi-Fi connectivity.

1.1 Connecting to a Unit via Web Interface

1. Navigate to the Wi-Fi network selection menu in your cell phone/tablet/computer
2. Connect to the Network with the SSID – "BoomBox6xxx"
3. Open your preferred web browser (Internet Explorer, Safari, Google Chrome, etc.)
4. Type in 192.168.1.1 into your web browser and open the page

You will then be connected to the Boom Box Web Interface. It is suggested to add this 192.168.1.1 page to your favorites or bookmarks.

➡ Note: For changing any advance parameters, a password may be required. The factory set password is "BoomBox3". The password is case sensitive.

1.2 Autonomous Mode Setup

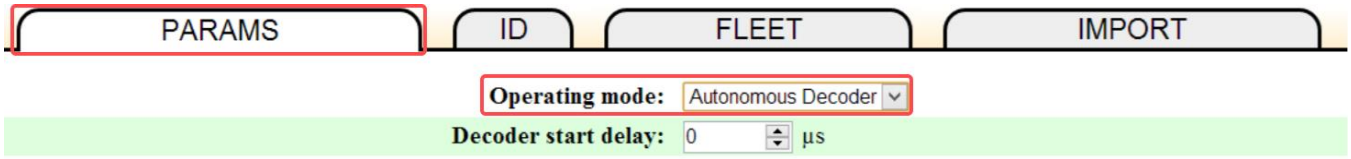
Autonomous mode allows shooters to fire shots independently based on dedicated GPS time slots. This mode involves more shooter interaction with the Web Interface than conventional modes.

Autonomous mode can be set either through the Web Interface, or through SourceLink.

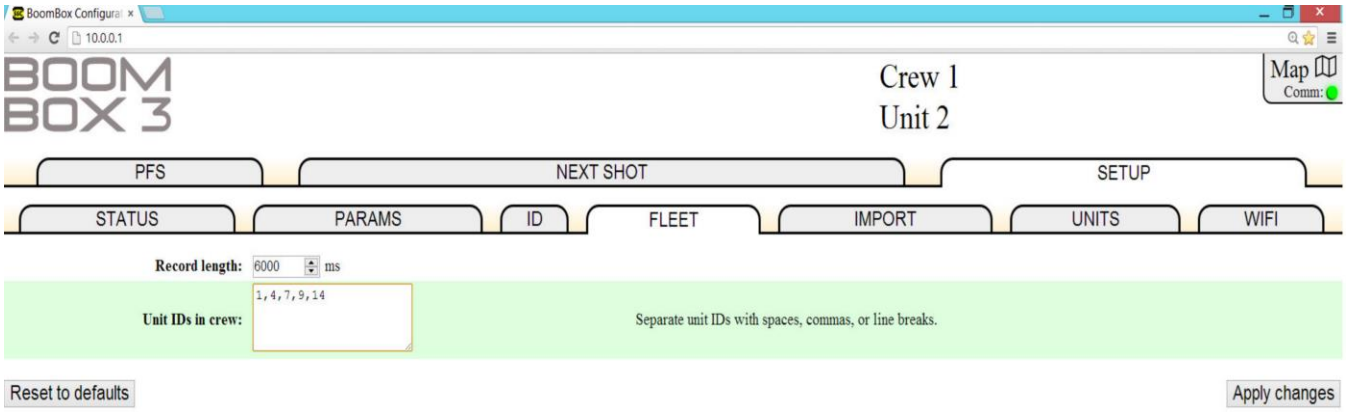
1.2.1 Setup Through Web Interface

To set the Boom Box 3 to autonomous mode through the Web Interface:

1. Open the Boom Box Web Interface
2. Navigate to the Setup => “Params” tab
3. Set Operating Mode to “Autonomous Decoder



4. Navigate to the Setup => “Fleet” tab to assign units. Set the Record Length and Unit IDs in the crew. **This is needed to allow the Boom Box 3 to calculate GPS time slots for firing shots**



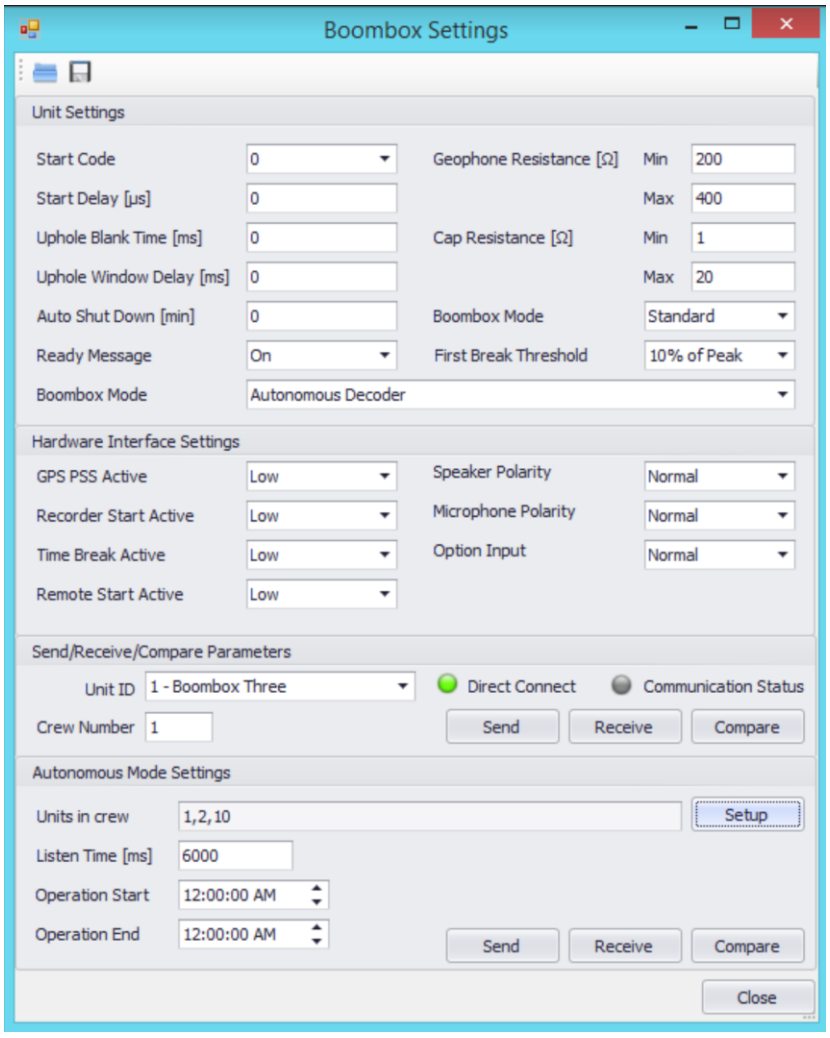
1.2.2 Setup Through SourceLink

To set the Boom Box 3 to autonomous mode through SourceLink:

1. Connect to the Boom Box 3 via SourceLink and open the program
2. Open Encoder/Decoder => BoomBox Parameters in SourceLink

Here, you can receive, send, or compare parameters. Ensure that the Unit ID and Crew ID matches the connected Boom Box.

3. In the Boom Box settings dialog window, set the Boombox Mode to “Autonomous Decoder”
4. Click “Send” to send this mode to the unit
5. Assign the Autonomous Mode units and Listen Time (or Record Length) to program slots using the Autonomous Mode settings.

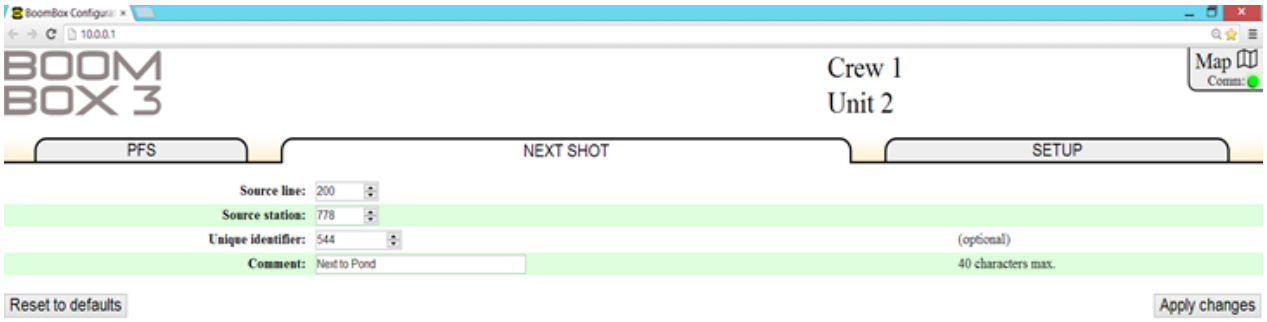


1.3 Assigning the Next Shot

Before each shot, the Shooter must assign a Line/Station associated with that shot. This can be done manually or automatically using the Map feature.

1.3.1 Assigning Next Shot Manually

After connecting to the Boom Box Web Interface, the user must then navigate to the Next Shot tab. They can then type in the Source Line and the Source Station and click/tap “Apply Changes”. The Unique Identifier and the Comment are both optional.



1.3.2 Assigning Next Shot Automatically

If a shot point is imported into the Web Interface, then the nearest flag will be displayed at the top of the screen with the distance to the flag. The nearest flag will automatically be selected for the next Line/Station. The user must then verify the numbers and click/tap “Apply”.

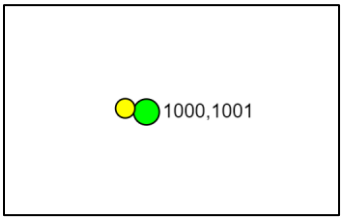
The automatic selection can be overridden by the user by simply typing in a Line/Station number manually and clicking/tapping “Apply”

1.3.3 Communication Status

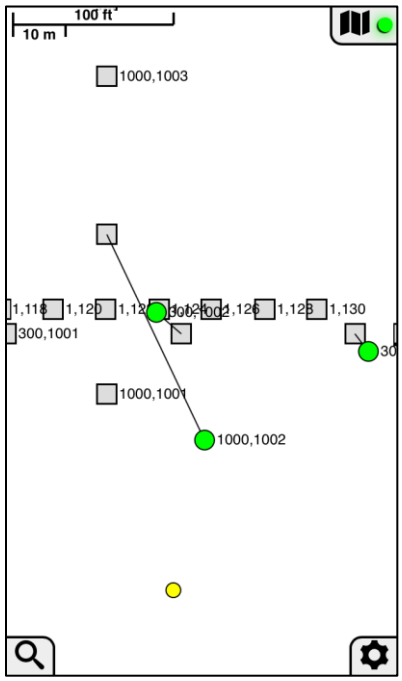
On the upper right-hand corner of the Web Interface is the communication status. Green indicates that the Web Interface has connection with the Boom Box 3. Yellow indicates that the Web Interface is attempting to communicate with the Boom Box 3. Red means that the Web Interface has failed to communicate.

1.3.4 Map & GPS

To open the shot point map, tap the map icon on the upper right-hand corner where the communication status is located.



The GPS position is saved in the Boom Box 3 and is represented by the yellow dot on the screen. Acquired shot points are represented as green dots, and source points are grey squares.

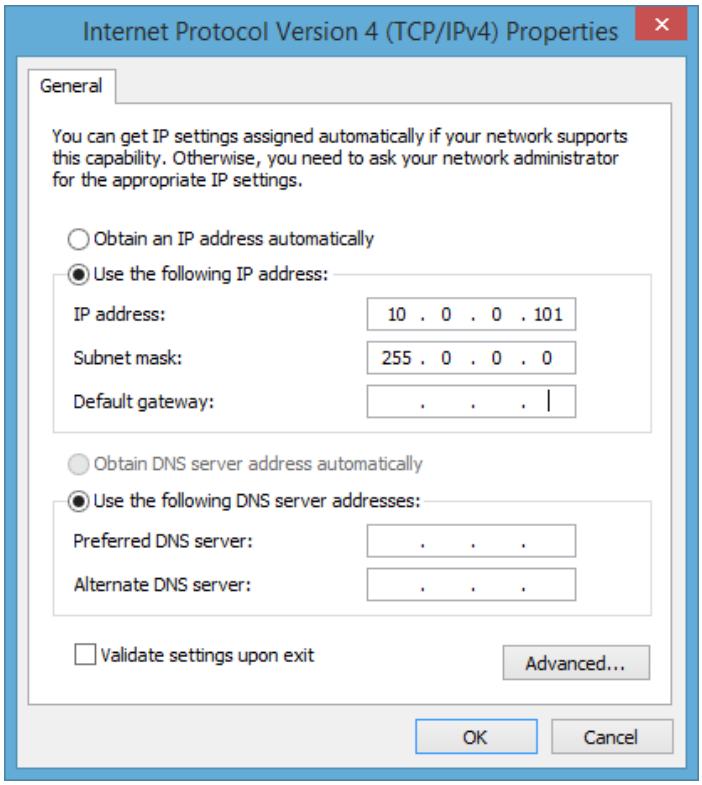


The green dots show the position that the user used GPS lock before firing the shot. A line is also drawn between that position and the source point that was selected. Always ensure that both GPS is locked and that the correct source point is selected before firing a shot.

2 Importing/Exporting with Direct Connection

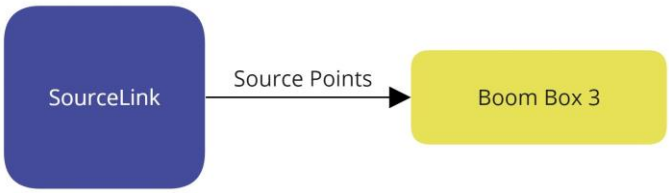
This section describes how to export source points directly from SourceLink to the Boom Box 3, and how to import shots directly from the Boom Box 3 into SourceLink.

To begin, ensure that the Boom Box is connected to the computer using a 10-pin Ethernet cable. Set the computer for a 10.x.x.x IP address as shown below. 10.0.0.101 is recommended. Make sure the Subnet mask is set to 255.0.0.0.

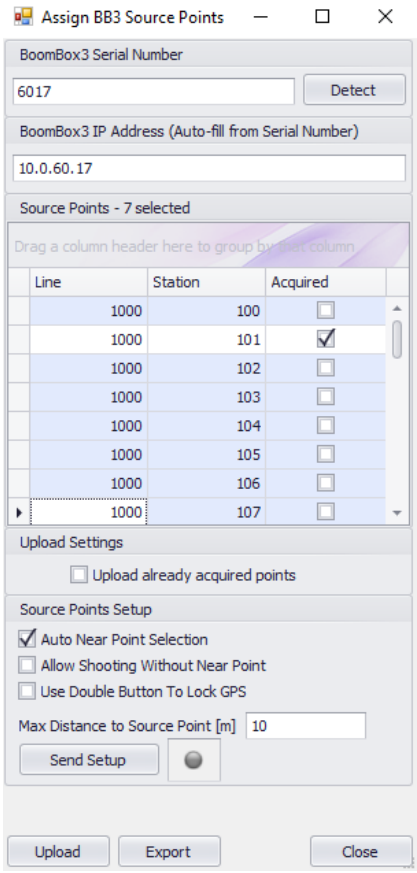


2.1 Loading Source Points into the Boom Box 3

Source Points can be loaded into Boom Box 3 hardware memory directly by using SourceLink. In this case, the BB3 display will show the nearest flag and assign it as Line/Station before the shot (See Assigning Next Shot Automatically).



Note: Only 10,000 points can be uploaded to the Boom Box 3 at this time.



After the Boom Box has been connected to the computer:

1. Open SourceLink
2. Select Encoders/Decoders from the Menu Bar => Upload Source Points to BoomBox3
3. Click "Detect" to connect to the Boom Box
4. Select Desired Source Points by Ctrl-Clicking or Shift-Clicking
5. Click Upload

In this example, Line/Station 1000/101 was not selected, therefore it will not be uploaded/exported.

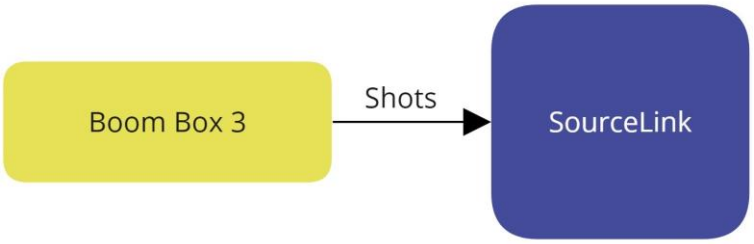
➡ Note: This window can also be used to Export the selected Source Points as an SP1 file. To do this, follow the previous instructions, but instead of clicking Upload, click Export.

2.1.1 Source Points Setup

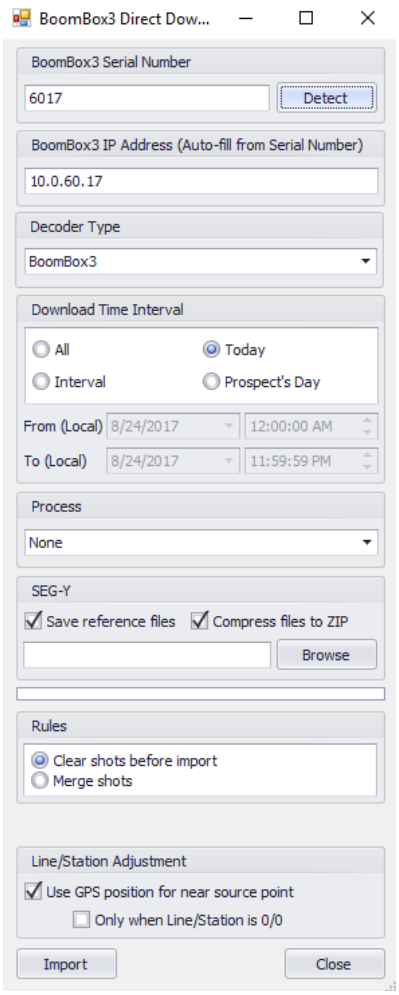
- Auto Near Point Selection – BB3 selects the nearest Source Point within the BB3 GPS position
- Allow Shooting Without Near Point – BB3 will shoot without any Source Points loaded, or at a location that is not loaded into the BB3
- Use Double Button to Lock GPS – Makes the BB3 operator press the Charge and GPS buttons at the same time to store the GPS position
- Max Distance to Source Point [m] – The maximum distance the BB3 can be from a Source Point and still be valid
- Send Setup – Send Source Points Setup to BB3

2.2 Loading Shots from Boom Box into SourceLink

SourceLink can be used to download shot information from multiple Boom Box 3 units. To download shots from a Boom Box 3 unit into SourceLink:



1. Open SourceLink
2. Select Download and Recover from the Menu Bar => Download Shots from BoomBox 3
3. Click “Detect” to connect to the Boom Box
4. Specify a Time Interval
    a. All
    b. Today will download shots for the current calendar day
    c. Interval will download the shots for a given date range
    d. Prospect’s Day will download the shots for the currently open prospect day
5. Select the process. This will allow SourceLink to populate the record length for the downloaded shots
6. Check the options for downloading the reference files and whether to zip them or not. If selected, provide a location to put the downloaded files
7. Select the rule
    a. Clear shots before import will ERASE all previous shots from the acquired shots and replace them with the shots from this download
    b. Merge shots will download the new shots from the BB3 and insert them into the already existing acquired shots. SourceLink will filter out already downloaded shots, so you will not have the same shot multiple times
8. Choose a Line/Station Adjustment Option
    a. Select the Use GPS position for near source point if you want to replace the Line/Station assignment from the BB3 with SourceLink’s near point pick based on the BB3 GPS location for the given shot.
    b. Select “Only when Line/Station is 0/0” if you want SourceLink to find the near point for only those shots that do not have a line/station number
9. Click Import



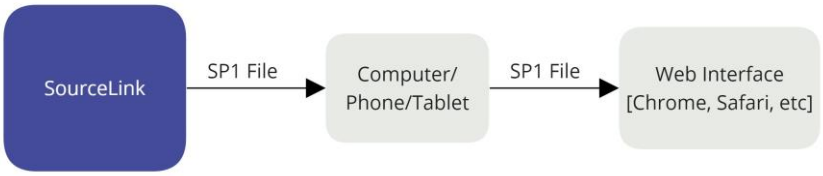
3 Importing/Exporting via Web Interface

Source Points and acquired shots can also be imported or exported through the Web Interface on a computer/cell phone/tablet. This way, a direct connection between the Boom Box 3 and SourceLink is never required.

Shots and Source Points imported into the Web Interface are stored in local storage on the device. Because of this, no more than 1000 points can be loaded into the Web Interface at any one time.

3.1 Exporting SP1 from SourceLink to Web Interface

Once Source Points have been created or loaded into SourceLink, they can be exported as an SP1 file which can then be loaded into the Web Interface on the device.



1. Open SourceLink
2. Click Survey => Script Export Wizard
3. Click Next and select SEG-P1 => Next
4. Select Output All Source Points or Output Acquired Source Points Only => Next
5. Select an output directory that you will remember => Next
6. Name the SP1 file => Next
7. Click Next through the rest of the menus to complete export.

3.2 Importing SP1 into the Web Interface

Importing the SP1 file into the Web Interface is simply a matter of:

1. Getting the SP1 file onto the device with the Web Interface
2. Importing the file

These steps may vary based on your situation, and what device you are using. This section will cover how to accomplish this on both Android and iOS.

3.2.1 Importing SP1 files onto an Android Device

Importing to Android is typically easier than on iOS because it allows direct user interaction with the file system. A few ways to deliver the SP1 file onto an Android Device are:

- Move files with USB cable
- Move files with Google Account
- Email files to device

3.2.1.1 Transferring files via USB

- Unlock your Android device
- With a USB cable, connect your device to your computer
- On your device, tap the "USB for..." notification
- Select Transfer files
- A file transfer window will open on your computer. Use it to drag files
- When you're done, eject your device from Windows
- Unplug the USB cable

3.2.1.2 *Transferring files with a Google Account*

- On your computer, go to https://drive.google.com
- Open or create a folder
- To upload files and folders, drag them into the Google Drive folder

3.2.2 Importing SP1 files onto an iOS Device

When using an iOS Device, most success has been found by uploading the SP1 file to a Google Account and then accessing it using the Google Drive App. This can be done by either uploading the file directly to a Google Account from a computer, or by emailing the file to the device, then saving it to the Google Account by using the app.

The biggest downside to this is that the device must have access to the Google Account while saving the SP1 to the Boom Box 3 Web Interface. This means that the device must have internet access either through Wi-Fi or 4G LTE (Or something equivalent).

3.2.3 Importing SP1 files into the Web Application

Once the SP1 file is saved onto your device, or saved in a Google Drive, it can be saved to the Web Interface. If you are using Google Drive to save your SP1 file, be sure to have internet connection by this point.

1. Open the browser on your device and open 192.168.1.1
    a. If nothing opens, be sure to connect to the Boom Box 3 Wi-Fi first, then open 192.168.1.1. After the first time opening the Web Interface, you won't need to be connected to the Boom Box Wi-Fi to access the Web Interface.
2. In the Web Interface, Open Setup => Import => Choose File
3. Select the documents if you are using an Android, or select Drive if you are using Google Drive
4. Locate the SP1 file and select it
5. Click "Apply Changes"

➡ Note: At this point, Source Points have been saved to local storage 'on the device'. They are not saved on the Boom Box 3.

3.2.3.1 *Another Example – iOS*

Here is another example going through the complete process using an iOS device. Google Drive App must be downloaded, and Wi-Fi must be accessible.

1. Save SP1 to Google Drive Account either on computer, or by emailing it to the device and saving it through the Google Drive App
2. Open the Boom Box 3 Web Interface on the device by opening an internet browser and entering 192.168.1.1 into the URL
3. Open Setup => Import => Choose File – **[Figure 3-1]**
4. Select 'Drive' (You may need to select 'More' and enable Drive first)
5. Locate the SP1 file in Google Drive and select it
6. Click "Apply Changes"

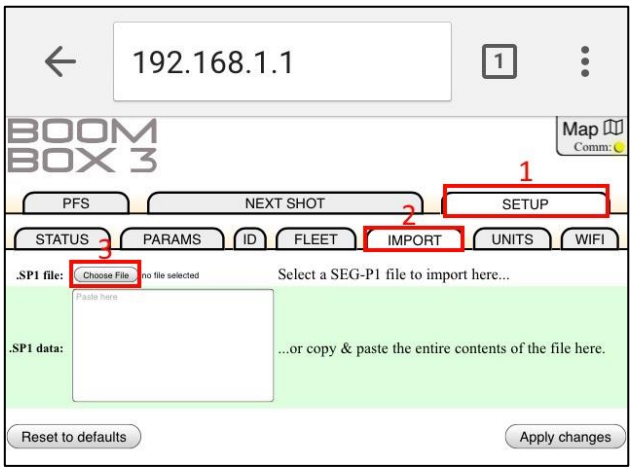
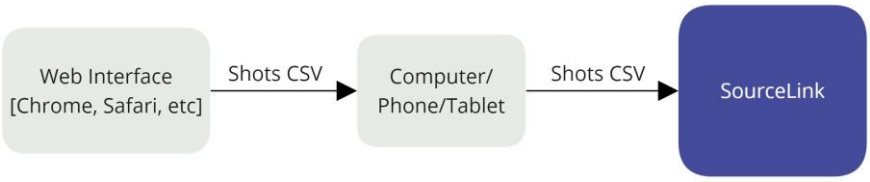


Figure 3-1

3.3 Importing Shots from Web Interface to SourceLink

This section will explain how to export shots as a CSV file from the Web Interface, and then how to import that CSV file into SourceLink.



Note: Remember that Shots in the Web Interface are saved on the device rather than the Boom Box.

3.3.1 Download CSV from Web Interface

1. Open the Boom Box Web Interface
2. Navigate to PFS => Export
3. Click “Generate Data” to fill the data field with shot information
4. Select “Email .CSV File” to send the file as an email, or “Download as .CSV File” to download it

3.3.2 Upload CSV to SourceLink

1. Open SourceLink
2. Click Download and Recover => Import Shots from RTM/BoomBox using PFS or Handheld CSV Files
3. Click Import
4. Select individual CSV files, or select a folder to add all contained files to import. A list of files ready to import will be populated
5. Click Import to Finish

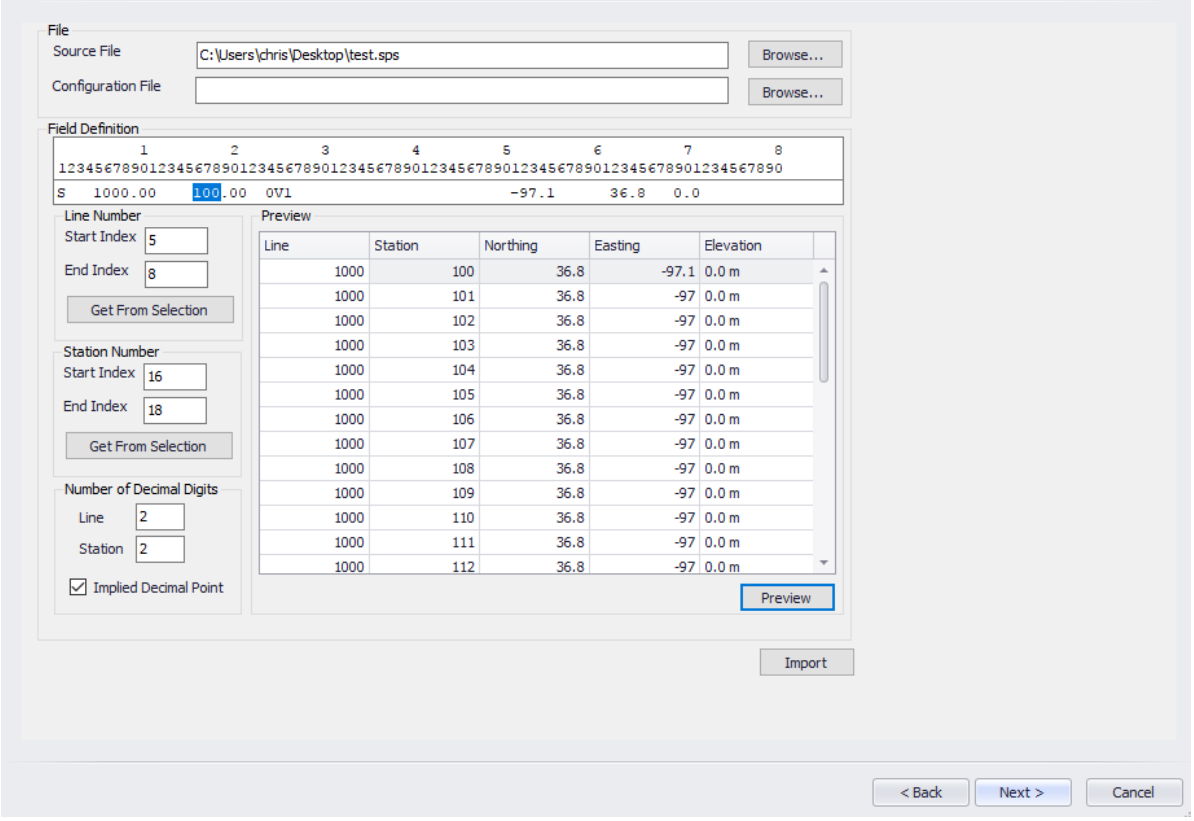
3.4 Importing SPS/SP1 into SourceLink

The following section is a brief explanation on how to import SPS or SP1 files into SourceLink.

3.4.1 Importing SPS file into SourceLink

To import an SPS file into SourceLink:

1. Open SourceLink
2. Click Survey => Script Import Wizard from the Main Menu bar
3. Click Next
4. Select SPS => Next
5. Change Projection if required, then click Next



6. Click Browse next to the Source File box and find the SPS file

At this point, the Columns for the Source Line and Station must be selected. Highlight the Columns to be used and click the appropriate box. These can also be entered manually.

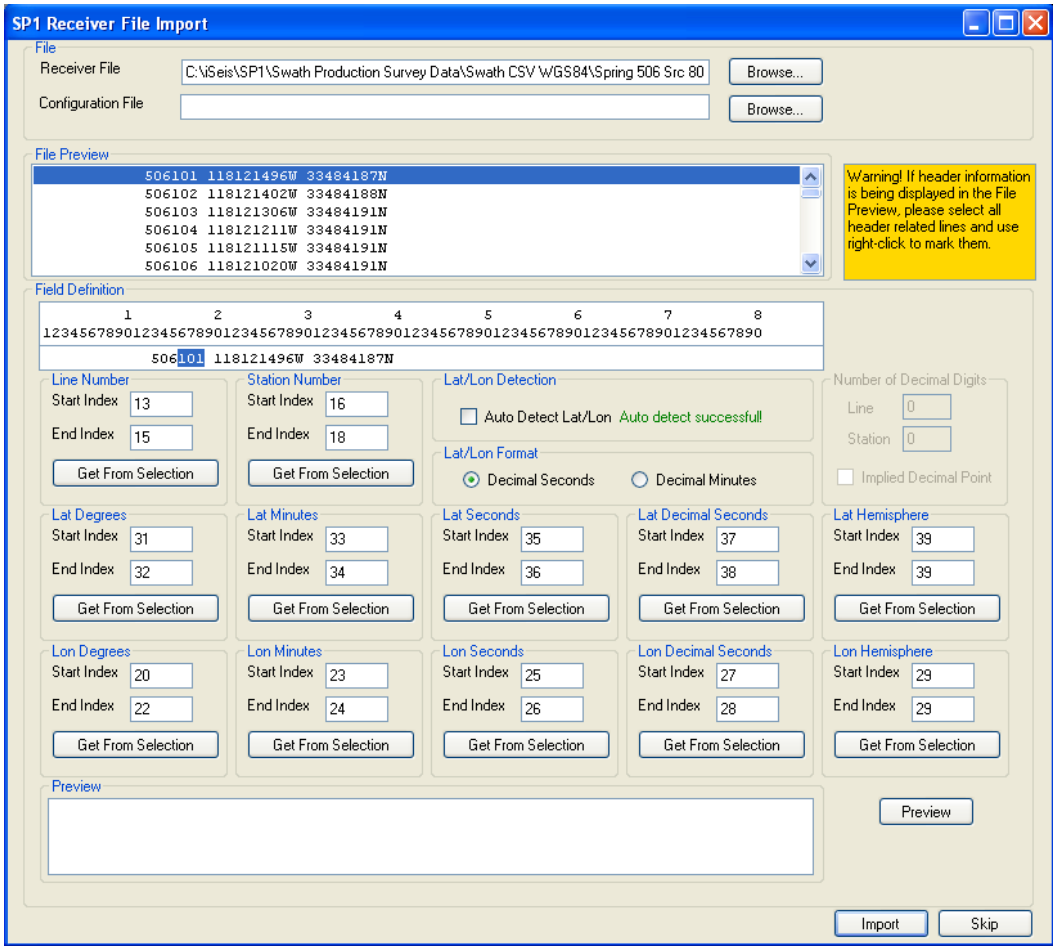
7. Select Preview and ensure everything is correct
8. Click Import

3.4.2 Importing SP1 file into SourceLink

To import an SP1 file into SourceLink:

1. Open SourceLink
2. Click Survey => Script Import Wizard from Main Menu bar
3. Click Next
4. Select SEG-P1 => Next
5. Click Next

If the file has a header, then it must be marked by selecting this data with the cursor and then right clicking.



After the header has been marked, select the Columns for the Line and Station.

After selecting the SP1 file, its content will be displayed in the File Preview section of the window. The first line of the file will also appear in the Field definition section. The content of this field definition window can be changed by selecting an item in the File Preview list. The purpose of the Field Definition is to be able to customize the SP1 file import.

Line Number definition: Highlight the section on the field definition that represents the line number and click on the Get from Selection button. The start and end index of the highlighted text will show up in the entry fields for the Line Number.

Station Number definition: Highlight the section on the field definition that represents the station number and click on the Get from Selection button. The start and end index of the highlighted text will show up in the entry fields for the Station Number.

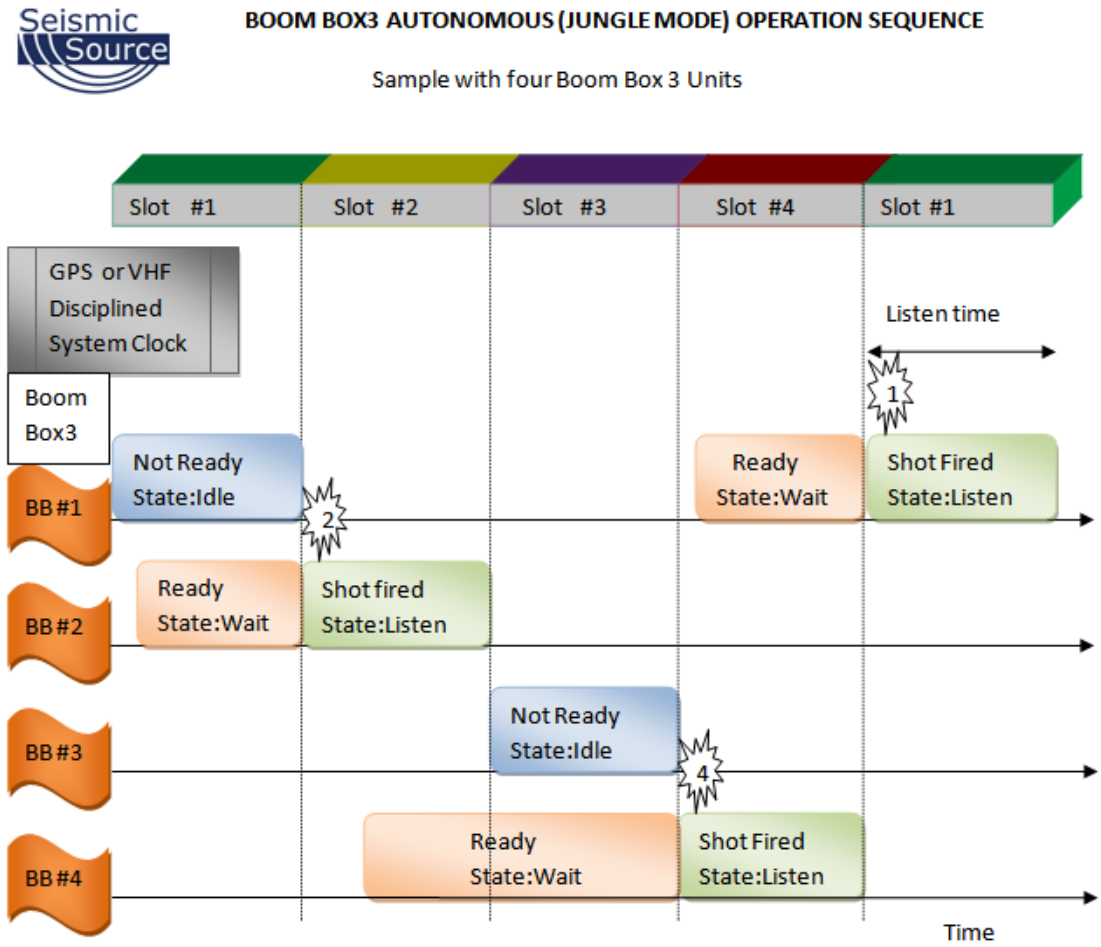
4 Autonomous Decoder Operation

The Autonomous Decoder Mode of operation is used to detonate a blasting cap for seismic dynamite operation. Extreme caution needs to be exercised when working around dynamite and detonation equipment. Review and follow all safety guidelines.

4.1 General Autonomous Decoder Operation

The Decoder unit is connected to a detonation Cap, an uphole geophone and a battery. Whenever the Decoder is connected to the CAP or whenever a radio is used, the CAP can fire at any time. The unit has been designed to only fire the CAP when both the ARM and the Charge button are held. However; potentially there is a chance that the CAP can accidentally fire from either RF noise or a hardware failure. The following is the normal operation procedure:

- The Shooter receives a valid GPS position for the new shot point.
- The Shooter Presses Boom Box 3 GPS Button to acquire new GPS Lock.
- The Shooter verifies that there is no danger in accidental firing of hole and that all personnel and livestock are clear of the shot hole.
- The "Shooter" connects the unit to the uphole geophone, and Cap at the new shot hole.
- The Shooter normally checks the resistance of both the geophone and the Cap.
- After all tests are satisfactory, the shooter calls in that he is ready(optional)
- The Shooter sets the Line/Station information of the shot either manually or automatically using the Wi-Fi or Computer interface.
- The Shooter then presses the "Arm" and "Charge" switches to get the box ready to fire.
- The Shooter then presses the Autonomous Decoder Fire switch to initiate the sequence (For added safety).
- The Boom Box 3 will start looking for the next available GPS time Slot, based on the preprogrammed Unit List and Record Length.
- The Unit will pick the nearest available time slot, but if the next slot is less than 10 seconds away, this slot is ignored and the next to next slot (calculated based on units, record length) is picked instead, for safety reasons.
- The Boom Box 3 display will update the remaining seconds for the Fire Slot.
- The Shot will be fired at the Fire Slot GPS Time if the Arm & Charge buttons are held.
- The Arm & Charge switch must be held at least for the last 4 seconds before the fire, for the fire to happen. If not, the shot will be cancelled for safety reasons.
- The shooter then releases the "Arm" and "Charge" switch and disconnects from the hole.
- The Decoder unit automatically saves the GPS Time, Position, Line/Station information, uphole information in the Flash Card.
- The shot information is updated in the Wi-Fi Interface Software.
- The Shooter can check the status of the Box immediately after the Shot is fired.
    - Test LED = Green when Confirmation Time Break is valid.
    - GPS LED = Green when Uphole time is valid
    - The display will show the Uphole time, CTB value, and battery voltage.


BOOM BOX3 AUTONOMOUS (JUNGLE MODE) OPERATION SEQUENCE
Sample with four Boom Box 3 Units
Slot #1
Slot #2
Slot #3
Slot #4
Slot #1
GPS or VHF Disciplined System Clock
Boom Box3
Listen time
1
BB #1
Not Ready State:Idle
2
Ready State:Wait
Shot Fired State:Listen
BB #2
Ready State:Wait
Shot fired State:Listen
BB #3
Not Ready State:Idle
4
BB #4
Ready State:Wait
Shot Fired State:Listen
Time

4.2 Detailed Autonomous Decoder Operation

The following section contains a more detailed operation list.

4.2.1 Uphole Geophone Resistance Test

- Press Test button on Front Panel to test Uphole Geophone
- Boom Box 3 Compares reading with internal limits
- Geophone Test includes
    - Resistance – measures DC resistance
    - Frequency – geophone must be planted in vertical position for frequency to pass
    - Damping - geophone must be planted in vertical position for damping to pass
    - Sensitivity - geophone must be planted in vertical position for sensitivity to pass
- Flashes Test LED green 4 times if result is within entered limits and there is a sensitivity reading.
- Flashes Test LED red 4 times if result is outside entered limits or there isn't a sensitivity reading.
- Geophone resistance will be shown on the Armed and Ready display.

4.2.2 CAP Resistance Test

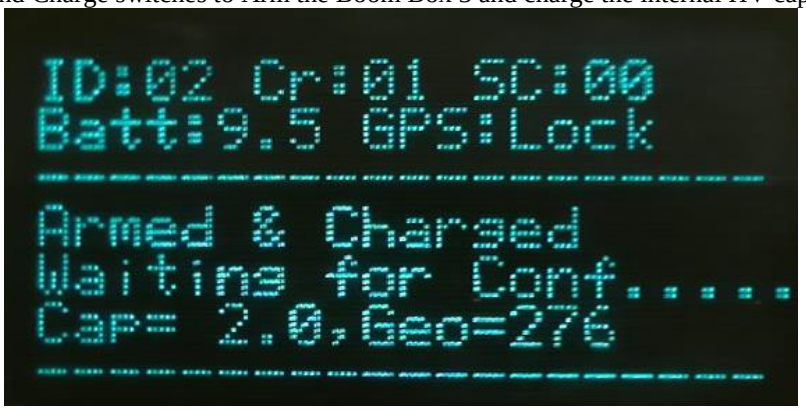
- Press Test button and ARM switch on Front Panel to test CAP resistance
- Boom Box 3 Compares reading with internal limits
- Flashes Test LED green 2 times if result is within entered limit
- Flashes Test LED red 2 times if result is outside entered limits
- CAP resistance will be shown on the display.

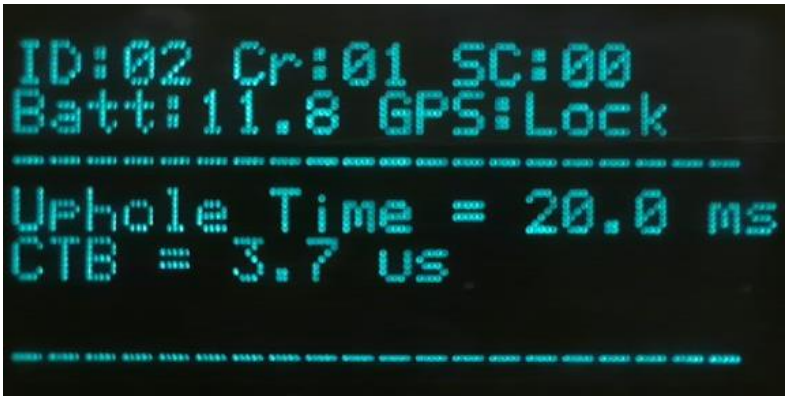
4.2.3 GPS Test

- Press GPS button to acquire new GPS position – 10 seconds.
- GPS LED is RED for the first 4 seconds to show the GPS button was pressed.
- Solid green GPS LED with a differential position. Display shows "GPS: Locked"
- Flashing green GPS LED with a non-differential position.
- Solid red GPS LED when a bad position was received.
- No GPS LED when no GPS information is received within 10 seconds of pressing the GPS button.
- The GPS LED's will stay this way until pressing the GPS button again or taking the next shot.

4.2.4 Fire Sequence -Autonomous Decoder

- Set the Line/Station information of the shot either manually or automatically using the Wi-Fi or Computer interface (refer corresponding sections in manual for details).
- Press both the Arm and Charge switches to Arm the Boom Box 3 and charge the internal HV capacitor.



- Press the Autonomous decoder fire switch.

- The Boom Box 3 Unit will fire the shot in the correct GPS time slot.
- The Shooter can check the status of the Box immediately after the Shot is fired.
    - Test LED = Green when Confirmation Time Break is valid.
    - GPS LED = Green when Uphole time is valid
    - The display will show the Uphole time, CTB value, and battery voltage.
- The display will show Uphole time, CTB value, and Battery voltage.