



# SFFR-6

Small Form Factor Tactical Repeater and Base Station

## USER MANUAL

Version 2.04a | February 2015



<b>1</b>	<b>Introduction.....</b>	<b>6</b>
1.1	Overview .....	7
1.2	Document Conventions.....	7
1.3	Features .....	8
1.4	Technical Specifications .....	10
<b>2</b>	<b>Getting Started .....</b>	<b>11</b>
2.1	Package Contents.....	12
2.2	Getting to know your GoBox.....	13
2.2.1	Locking Clamps.....	13
2.2.2	Lid.....	13
2.2.3	Interface Module.....	14
2.2.4	Battery Compartment .....	15
2.2.5	Control Module .....	15
2.2.5.1	Ethernet (Programming Port).....	15
2.2.5.2	Accessory Connector .....	15
2.2.5.3	Status Window .....	16
2.2.5.4	Backlight Button .....	16
2.2.5.5	Power Button .....	16
2.2.5.6	Rotary Dial and Button .....	16
2.2.5.7	Tx and RX LED.....	16
2.2.5.8	Power LED .....	16
2.2.6	Radio Module .....	16
2.2.7	Duplexer .....	17
2.2.8	Power Amplifier.....	17
<b>3</b>	<b>Configuration.....</b>	<b>18</b>
3.1	Before you begin .....	19
3.1.1	About GoBox Configuration Files .....	19
3.1.2	About Operational Profiles.....	19
3.1.3	About Duplexer Group Tags .....	19
3.1.4	What you need to program and test your GoBox .....	20
3.1.4.1	Laptop or PC with an Ethernet Interface .....	20
3.1.4.2	Radios.....	20
3.2	Connecting to your GoBox configuration interface .....	21
3.3	Managing Operational Profiles .....	22
3.3.1	Adding a P25 Conventional Repeating Profile.....	22
3.3.2	Adding a P25 Networked Repeating Profile .....	23
3.3.3	Setting the Operational Profile Order .....	25
3.4	Managing Duplexers .....	26
3.4.1	Writing a Duplexer Group Tag.....	26
3.4.2	Setting the start-up profile for a Duplexer .....	27
<b>4</b>	<b>Using the GoBox .....</b>	<b>29</b>
4.1	Turning your GoBox On.....	30
4.2	Selecting an Operational Profile.....	30
4.3	Checking GoBox Status.....	30
4.3.1	Status Window .....	30
4.3.1.1	Checking Battery Status .....	30
4.3.1.2	Checking External Power Source.....	30
4.3.1.3	Checking the current operational profile .....	31

4.3.2	Web configuration interface .....	31
4.3.2.1	Checking Battery Status .....	31
4.3.2.2	Checking Duplexor Status.....	32
4.3.3	Checking Active Profile .....	32
4.4	Administration .....	33
4.4.1	Backing up your GoBox Configuration.....	33
4.4.2	Restoring your GoBox Configuration from a Backup.....	34
4.4.3	Clearing the Gobox Configuration from memory.....	34
<b>5</b>	<b>Troubleshooting.....</b>	<b>35</b>
5.1	Cannot connect to the GoBox Web Interface .....	36
5.2	Status Window displays No IGEP .....	36
5.3	Status Window display Err: xr1 or Err: xr2 .....	36
5.4	There are no profiles to select on the GoBox Control Panel.....	36
5.5	GoBox Web UI displays “Template Syntax Error” .....	36
<b>6</b>	<b>Glossary.....</b>	<b>37</b>

## Regulatory Compliance

**CAUTION:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### FCC Class 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.

### Industry Canada RSS 210

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

### Human Exposure to Radio Waves

The equipment contains a transmitter which is designed to generate radio frequency (RF) energy. The RF energy can be radiated by an external antenna when attached by the end user to the antenna port. The antenna port has a 50 ohm characteristic impedance and must be operated with an antenna also with a 50 ohm impedance.

The system is designed to be operated so as to avoid contact with the antennas by the end user. It is recommended to set the system in a location where the antenna can remain at least a minimum distance as specified from the user in accordance to the regulatory guidelines that are designed to reduce the overall exposure of the user or operator.

### Compliance to Industry Canada Guidelines for Human Exposure to Radio Waves

The equipment has been evaluated for RF exposure for humans in reference to ANSI C 95.1 (American National Standards Institute) limits. The evaluation was based on RSS-102 Rev. 4. To maintain compliance, for General Public (Uncontrolled Environment), the minimum separation distance for an antenna with 2.14 dBi gain, is 32.3 inches (82 cm) from bystanders.

L'équipement a été évalué pour l'exposition aux RF pour les humains en référence à la norme ANSI C 95.1 (American National Standards Institute) des limites. L'évaluation a été basée sur RSS-102 Rev. 4. Pour maintenir la conformité, pour Générale Publique (Environnement non contrôlé), la distance minimale de séparation pour une antenne avec 2.14 dBi, est de 32.3" (80 cm) de passants.

## General Safety

### **Warning - Hot Surfaces**

Some of the surfaces of the equipment can become very hot during operations with prolonged transmission cycles or at elevated ambient temperatures, especially the heatsink areas. Exercise caution when handling or carrying the unit if it has been operating under these conditions.

### **Attention - Surfaces chaudes**

Certains des surfaces de l'équipement peut devenir très chaud pendant les opérations avec des cycles de transmission prolongées ou à des températures ambiantes élevées, en particulier les zones de dissipateur thermique. Faites preuve de prudence lors de la manipulation ou de transporter l'appareil se il a été exploitée dans ces conditions.



# 1 Introduction

## 1.1 Overview

The SFFR-6, also known as the GoBox, is a small form factor, highly portable, self-powered, APCO P25 standalone repeater and base station capable of delivering analogue and P25 conventional networked and standalone functionality.

The GoBox weighs in at just over 9.0Kgs, and can deliver up to 15W of RF output power from its 2 hot swappable Lithium Ion rechargeable batteries.

When connected to external AC or DC power source, the GoBox is able to operate continuously while simultaneously acting as a battery recharger.

Unlike any other portable P25 tactical repeater on the market, the GoBox is also a fully featured networkable base station that can extend existing fixed station network infrastructure coverage. The GoBox can deliver a full suite of P25 network services and functionality including support for all P25 call types, supplementary and data services such as AVL and OTAR when connected to a core network.

GoBox's can also be networked together when connected to Etherstack's RFSS Network Controller via its on-board Ethernet interface. The GoBox can connect to an IP backhaul using Cat5/Cat6 or can connect to an external 3G/4G cellular, Wi-Fi or Satellite based IP uplink via the Ethernet interface.

Multiple Go Boxes can also be used to provide P25 digital to digital cross-band operation (e.g. VHF and UHF cross-banding), or P25 digital and analogue interoperability (e.g. UHF P25 & VHF analogue) when used with Etherstack's RFSS Network Controller.

To further simplify operation and enable fast deployment and setup, multiple operational configurations can be pre-programmed and permanently saved into the GoBox for quick selection and activation via the GoBox control dial.

In addition, a default configuration profile can be keyed to a specific duplexer such that on insertion of a duplexer, an associated default profile can be selected. This feature totally eliminates the need for any configuration in the field and truly speaks to why we love to call this product ... the Go Box !

## 1.2 Document Conventions

Within the document you will see two text highlights.



This is a hint or useful tip box



This is a key highlight or important information box

## 1.3 Features

### Protocols

P25 Conventional (Repeat Only)	Standard
P25 Conventional Network	Option
P25 Trunked Composite 1+0 (Repeat Only)	Option
P25 Trunked Composite 1+0 Network	Option
Analogue	Option
Analogue Network	Option

### Operational Modes

Repeater (Standalone)	Standard
Base Station (Networked)	Option

### Network Options

Ethernet 100Mbps	Standard
3G IP Bridge	Option
4G IP Bridge	Option
Wi-Fi IP Bridge	Option
Satellite IP Bridge	Option

### Duplexer Modules

Quick Change Duplexer Module	Standard
1 Duplexer Module	Standard
2 or more Duplexer Modules	Option

### Power Options

AC Power	Standard
DC Power	Standard
2 x Lithium Ion Batteries	Standard
Hot Swappable Batteries	Standard
Inbuilt battery charger	Standard
External battery charger	Option
Additional Lithium Ion Batteries	Option
Redundant Power Supplies	Standard

### Connectors

AC Power	Standard
DC Power	Standard
Control Module Ethernet Transmit/Receive (Programming)	Standard
Interface Module Ethernet Transmit/Receive (Network Mode)	Standard
RF Transmit/Receive	Standard
Accessory Connector (Control Module)	Standard

### User Interface

Power Button	Standard
LCD Backlight Button	Standard
Rotary Dial	Standard
Rotary Button	Standard



## Status Indicators

Power On	Standard
Receive Signal Detected	Standard
Transmit Enabled	Standard
AC Power Detected	Standard
DC Power Detected	Standard
Battery 1 Detected	Standard
Battery 1 Power Level	Standard
Battery 1 Charging Status	Standard
Battery 2 Detected	Standard
Battery 2 Power Level	Standard
Battery 2 Charging Status	Standard
Active Profile	Standard
Programming Port Ethernet Transmit (Control Module)	Standard
Programming Port Ethernet Receive (Control Module)	Standard
Network Port Ethernet Transmit (Interface Module)	Standard
Network Port Ethernet Receive (Interface Module)	Standard
LCD Backlight	Standard

## Software Features

Profile Management	Standard
Profile Ordering	Standard
Accidental Profile Change Protection	Standard
Auto Profile Filtering via Duplexer Group Tag on GoBox Interface	Standard
Auto Profile Selection for Duplexer Group Tag	Standard
Duplexer Viewer	Standard
Auto LCD Backlight Enable	Standard
Tamper Protection and PIN Access	Option
AES 256 Software Encryption	Option
AES 256 Hardware Encryption (FIPS 140-2)	Option

## Administration

Web Based Configuration Tool	Standard
Configuration Backup	Standard
Configuration Restore	Standard

## 1.4 Technical Specifications

### General

Dimensions	259 mm (D) x 216 mm (W) x 198 mm (H) (10.2 in (D) x 8.5 in (W) x 7.8 in (H))
Weight	9.0 kgs <sup>1</sup> (19.8 lbs) <sup>1</sup>
External Casing	Aluminium Alloy
Certifications	AS/NZS 4295

### Input Power

AC	100 – 250 VAC
DC	10.8 - 15.6 VDC / 10Amps
Batteries	2 x Lithium Ion 11.25V 8850mAh

RF Specifications	VHF	UHF
Supported Frequency Ranges	136-174 MHz	380-520 MHz <sup>2</sup>
Channel Spacing	12.5 kHz	12.5 kHz
Channel Step Size	2.5 / 3.125 kHz	2.5 / 3.125 kHz
Modulation	C4FM / FM	C4FM / FM
Duplexer	Internal notch type single antenna 4.5MHz Minimum Split	Internal notch type single antenna 5MHz Minimum Split

### Transmitter

Output Power	1W to 15W	1W to 15W
Conducted Spurious Emissions	<-20 dBm	<-20 dBm
Modulation Fidelity	<1%	<1%
Frequency Accuracy	+/- 1.0 ppm	+/- 1.0 ppm
Adjacent Channel Power	67 db	67 db

### Receiver

Reference Sensitivity	-116 dBm	-116 dBm
Selectivity	60 db	60 db
Intermodulation Rejection	75 dB	75 dB
Conducted Spurious Emissions	-57 dBm	-57 dBm

<sup>1</sup> Includes UHF duplexer and two batteries

<sup>2</sup> Covered by two duplexer bands 380-470MHz and 440-520MHz



# **2 Getting Started**

## 2.1 Package Contents

1

### Go Box

The GoBox will be in the carry mode with its lid closed and both locking clamps engaged.

The GoBox will be pre-fitted with a GoBox control module, GoBox radio modules, GoBox Duplexer (in the band/frequency requested at time of order), 15W power amplifier and dual hot swappable battery module.



2

### AC Power Cable

The AC power cable will have a standard AC power plug for your country of operation (requested at time of order) on one end and will have an IP67 rated coupling socket for connection to the GoBox on the other.



3

### DC Power Cable

The DC power cable will be pre stripped for connection to standard telecommunications grade power supplies on one end and will have an IP67 rated coupling socket for connection to the GoBox on the other.



4

### 2 x Lithium Ion Rechargeable Batteries

Each battery will require a full charge prior to first use.

It is recommended that any additional batteries be sourced through your authorised reseller.



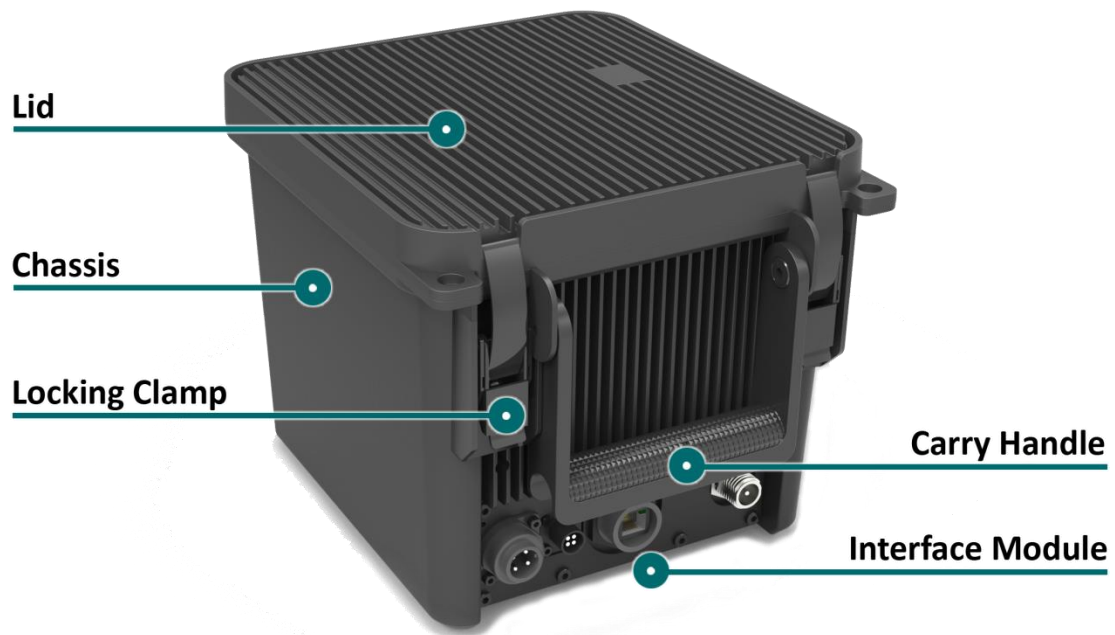
5

### Lithium Ion Battery Recharger (Optional Accessory)

An external battery charger is available as an option.



## 2.2 Getting to know your GoBox



### 2.2.1 Locking Clamps

The GoBox has two locking clamps on either side of the Carry Handle to lock the lid firmly against the chassis.

To disengage the locking clamps, place your finger behind the clamps and pull away and up towards the lid. Lift the curved section of the locking clamp up and out of the channel in the top of the lid and repeat for the other clamp to release the GoBox lid.



Both locking clamps must be fully engaged to ensure a correct seal.

### 2.2.2 Lid

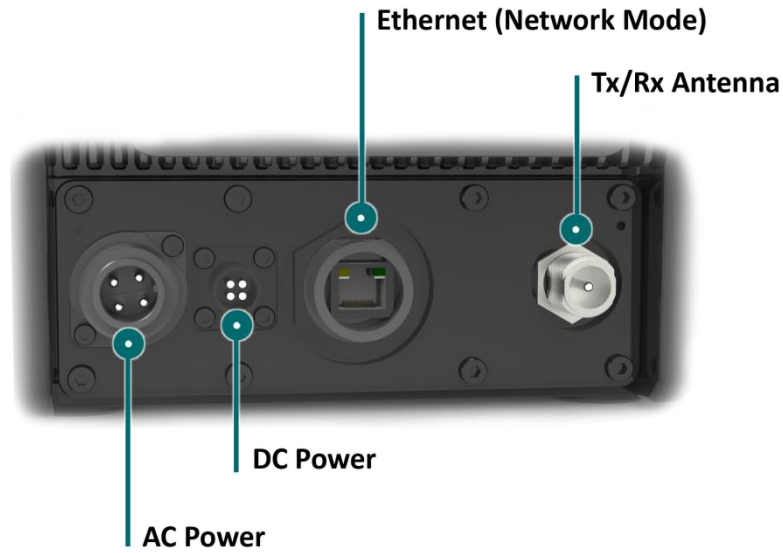
The GoBox lid has been designed to prevent dust and water from entering the GoBox when the locking clamps are fully engaged.



Once the GoBox has been programmed, the lid only needs to be opened to turn the GoBox on when powered under batteries. The lid does not need to be closed during operation however it is recommended to be closed during infield use.



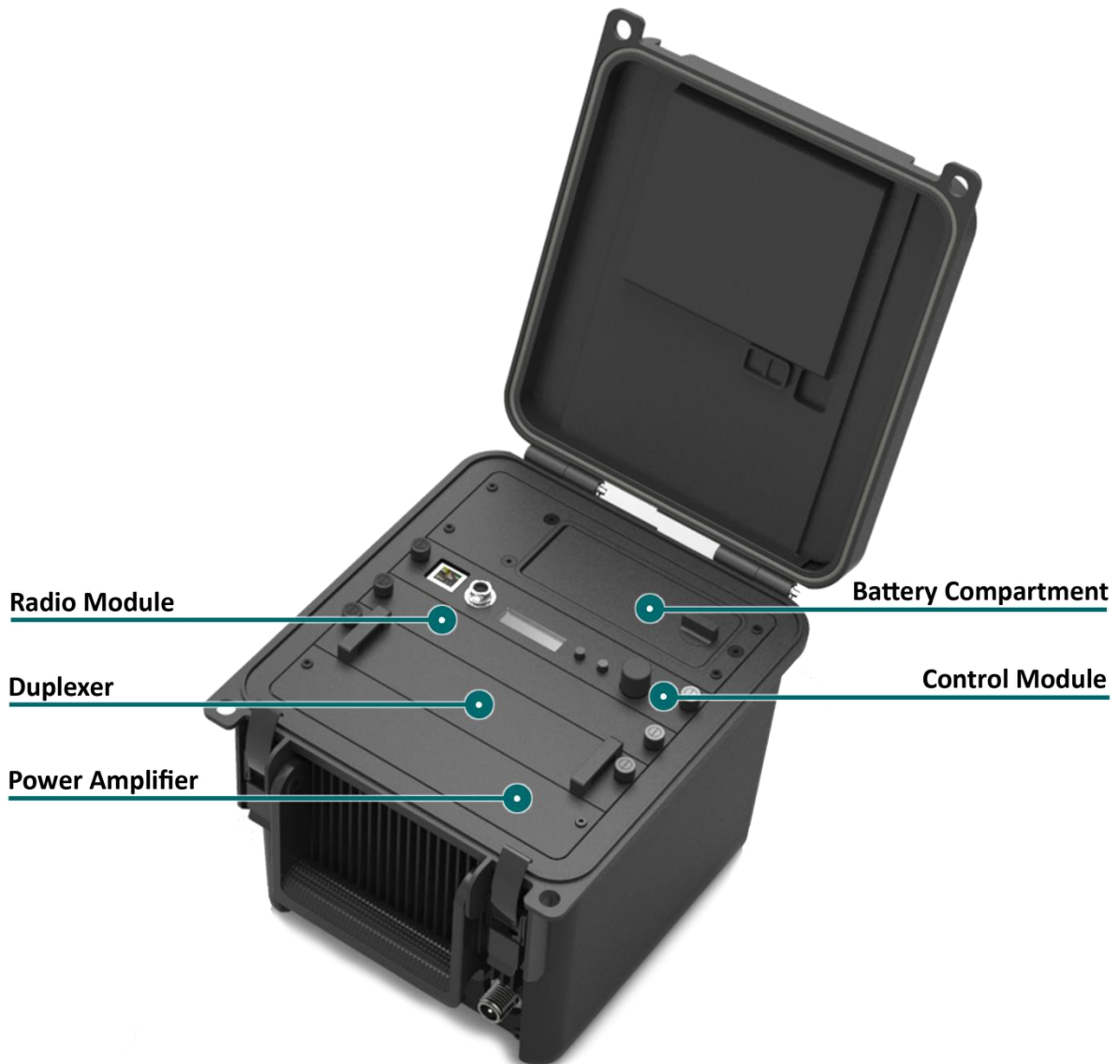
The lid gasket located around the lid perimeter of the chassis must be kept clean and free of any debris. It should be inspected before field operation and cleaned or replaced if damaged otherwise water or dust could penetrate and damage GoBox electronics.



### 2.2.3 Interface Module

The interface module will vary based on the options purchased when your GoBox was ordered.

The interface module presents both AC and DC connectors, combined transmit and receive antenna connector or separate transmit and receive antenna connectors and/or an Ethernet port for use in Network mode.



## 2.2.4 Battery Compartment

The battery compartment supports two lithium ion batteries and while only one battery is required to operate the GoBox it is recommended to install two batteries to maximise run time when no AC or DC power is connected.

To open the battery compartment, turn the locking dial on the battery compartment 90 degrees counter clockwise and pull up to access the battery compartment. To lock the battery compartment, lower the battery compartment lid and turn the dial 90 degrees clockwise.

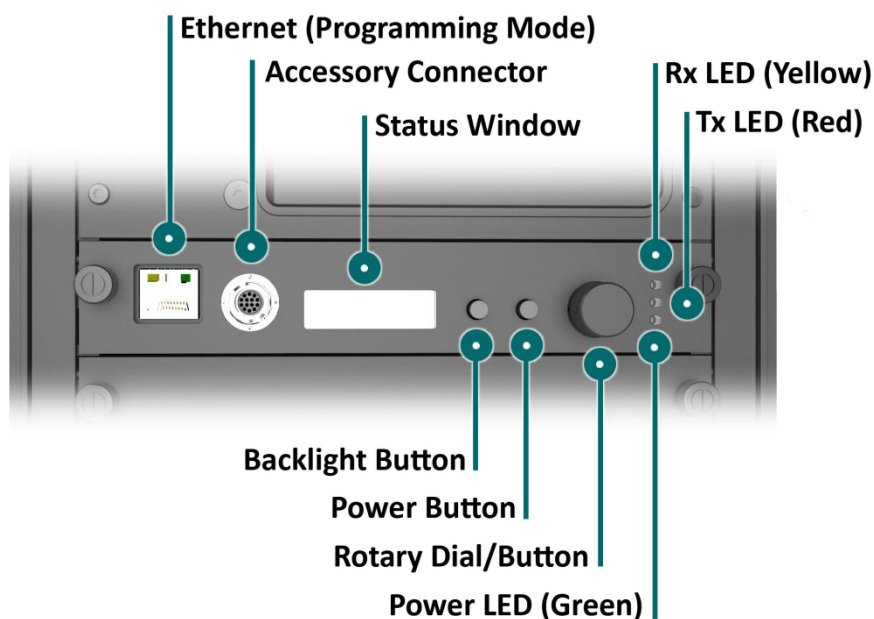
Each battery supplied will have a small nylon tag attached to the battery so it can be easily removed when installed in the GoBox Battery Compartment.

Each battery also has a battery charge status indicator that can be activated by pressing the small button located on the corner of the battery.

The battery compartment has also been designed to allow battery hot swapping to quickly replace an exhausted battery source without the need to turn the GoBox off.

The battery compartment has also been designed to recharge batteries when an external power source is applied. Battery charge and charging state is explained under the control module section below.

## 2.2.5 Control Module



### 2.2.5.1 Ethernet (Programming Port)

The Ethernet programming port is used to check GoBox status and to configure the GoBox.

Attach a standard Ethernet cable to this port with the other end connected directly to your laptop/PC. From your web browser type <http://172.16.10.1> to gain access to the GoBox configuration interface.



Some corporate IT policies may prevent accessing this subnet from your laptop/PC either directly or across your network. Please contact your local IT support team if you have trouble accessing the GoBox configuration interface.



Do not attach an Ethernet cable to both Ethernet ports on the GoBox at the same time to a switch/router as it may cause some network switches/routers to fail.

### 2.2.5.2 Accessory Connector

The accessory connector is used to connect a local speaker microphone or short range wireless speaker microphone or headset for operation with the GoBox.

For further information on available accessories please contact your authorised distributor.

### 2.2.5.3 Status Window

The status window displays the currently selected operational profile, power level of each battery, status of the on-board battery charger and external power source if AC and/or DC power is connected.

### 2.2.5.4 Backlight Button

The backlight button when pressed will engage the LCD backlight for several seconds so the LCD display can be more easily viewed if external lighting conditions are poor.



The backlight is on a timeout to ensure it is not left on and otherwise drain the batteries unnecessarily.

### 2.2.5.5 Power Button

The power button when pressed and held down will toggle the power status of the GoBox.



The power button must be held done for several seconds to avoid accidental power on/off scenarios.

### 2.2.5.6 Rotary Dial and Button

The rotary dial is used to quickly select different operational profiles.

On pressing the rotary dial, the status window backlight will automatically illuminate and remain on until the rotary dial button is released. You can turn the dial to select any of the available and pre-configured profiles.

Once a profile has been found, releasing the rotary dial push button will commence a reconfiguration of the GoBox. During this time the Green Power LED will flash indicating a reconfiguration is in progress. When the Green Power LED turns solid, the GoBox is ready for operation.



To avoid accidental profile changes, the rotary dial must be pressed during rotation.

### 2.2.5.7 Tx and RX LED

On receiving a signal on the frequency the GoBox is programmed for, the yellow Rx LED will illuminate for the duration of the signal. The red Tx LED will illuminate to indicate that the signal has been repeated.



Based on the configuration profile, the Tx LED may not illuminate.

### 2.2.5.8 Power LED

On power-up, the GoBox will perform a series of self-tests to ensure all elements are operational. During this time the LED will flash to indicate that power is on but the GoBox is not yet operational. Once the LED turns a solid Green, the GoBox is ready for use.



The GoBox when first unpacked will not have any operational profiles to execute. Until the GoBox has been configured, the Power LED will continue to flash, indicating it is in the programming state.

## 2.2.6 Radio Module

The radio module houses two high performance radio transmitters and receivers. These modules are band specific and will be pre fitted based on the frequency band of the duplexer fitted at the time of order.



The GoBox radio modules have been designed to run at high temperatures in order to support the power output and high duty cycles typical of a heavy use repeater/base station. Care must be taken if the GoBox has been running for several hours supporting a large volume of calls. The front panel of the radio module can exceed 50°C.



## 2.2.7 Duplexer

The GoBox will be fitted with a duplexer when the single antenna interface is fitted. The duplexer module will be tuned to the centre frequency requested at the time of order to maximise RF performance.

Additional Duplexers in the same band can be ordered and swapped within minutes. Additionally the GoBox can auto sense the installed duplexer and select the correct operational profile without any user interaction.



The Duplexer is not hot swappable. You must ensure the GoBox is powered down, batteries removed and all external power sources disconnected before removing the Duplexer module.

To remove the Duplexer, ensure the GoBox is off and all power sources removed. Turn the locking screws counter clockwise to remove and lift the Duplexer module out.

## 2.2.8 Power Amplifier

The GoBox will be fitted with a power amplifier.



The GoBox Power Amplifier has been designed to run at high temperatures in order to support the power output and high duty cycles typical of a heavy use repeater/base station. Care must be taken if the GoBox has been running for several hours supporting a large volume of calls. The chassis area located near the handle can get hot.



# **3 Configuration**

## 3.1 Before you begin

### 3.1.1 About GoBox Configuration Files

The GoBox Configuration file is stored within the GoBox but you should develop a process to centrally backup and manage this configuration file.



If your GoBox is ever damaged or you purchase additional units, your configuration file can be easily used to reprogram a new GoBox within minutes.

For users that maintain several GoBox's, the configuration file can be shared and it is recommended that a single file be used to simplify GoBox administration.

### 3.1.2 About Operational Profiles

To use your GoBox you need to program at least one operational profile which can then be assigned to a duplexer for auto selection on power-up.

Up to 50 operational profiles can be pre-loaded into the GoBox. Each operational profile contains all information necessary to configure the GoBox.

Profiles can then be selected and activated by pressing and turning the rotary dial on the GoBox control interface to select and activate that profile.



Make sure you press and hold the rotary dial down when turning to select a new profile.



Operational profiles can also be backed up and restored over the network allowing easy transfer of profiles from one GoBox to another



To setup multiple GoBox's, we recommend using the following process on a single GoBox:

1. Write a Duplexer tag to each Duplexer
2. Add Duplexer Group Tags
3. Add Operational Profiles
4. Set the start-up profile for each Duplexer
5. Backup the configuration
6. Restore the configuration to the other GoBox's

### 3.1.3 About Duplexer Group Tags

A unique duplexer tag can be programmed into a duplexer and then tagged to an operational profile to essentially link the operational profile with the duplexer.

The GoBox will only display operational profiles whose duplexer group tag field has been set to the same tag group as what is programmed in the duplexer.



If an operational profile uses the **All** tag, the profile will always be visible in the GoBox control panel via the rotary dial however its frequency may not be supported by the currently installed Duplexer

Additionally, an operational profile can be assigned as the default operational profile for when a Duplexer is installed and therefore when the GoBox powers up. This feature allows Duplexers to be easily moved around GoBox's in the same band and providing the configuration files are identical, the GoBox will automatically select the correct operational profile without requiring any user intervention.

## 3.1.4 What you need to program and test your GoBox

### 3.1.4.1 Laptop or PC with an Ethernet Interface

The GoBox doesn't not require any external programming application to be installed on your laptop/PC and does not require a special programming cable.

A laptop or PC with a web browser and standard Ethernet cable is all that will be required to configure the GoBox. Once configured the laptop is no longer required for GoBox operation.

### 3.1.4.2 Radios

Mobile and/or portable radios will be required to be programmed for the Duplexer frequency and other supported operational parameters such as NACs configured in the GoBox.



A simple way to test GoBox operation is to simply PTT on a correctly programmed radio. If correctly programmed, the GoBox Rx and Tx LEDs will illuminate.

## 3.2 Connecting to your GoBox configuration interface

Once your GoBox has been connected via an Ethernet cable using the Ethernet port on the control module to your laptop/PC or network you will be able to:

- View battery presence and charging status
- View details of the installed duplexer
- Read and write a profile tag to the duplexer
- Create, edit and delete operational profiles
- Backup and restore a GoBox configuration

Ensure the GoBox is connected, powered on and connected via Ethernet to your PC/laptop either directly or via a network. Open your web browser and type the following <http://172.16.10.1/>



You need to ensure your PC can access the **172.16.10.x** subnet.

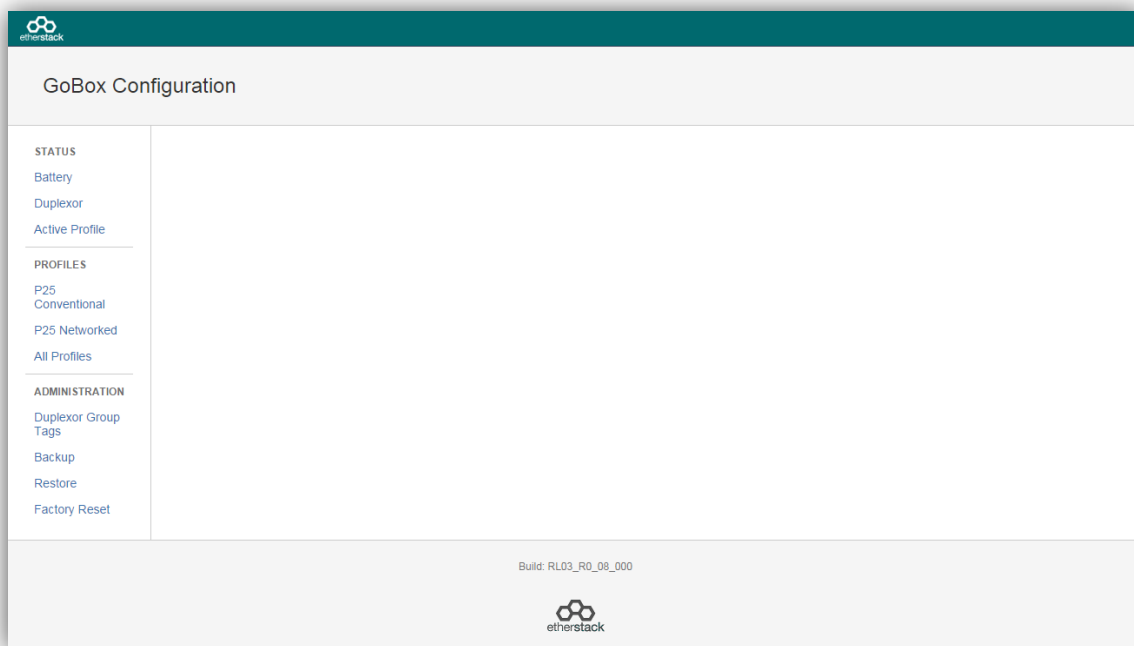
The following network settings will be required to be configured into your PC/laptop:

IP Address: **172.16.10.100**

**Note:** the use of the 100 address is an arbitrary value but selected so it does not clash with the GoBox address or another IP device on the network.

Subnet Mask: **255.255.0.0**

Default Gateway: **172.16.10.254**



The configuration page above will display showing a navigation pane on the left and a content pane on the right. At the bottom of the page is the software build currently installed on the GoBox.



If you see this page you have successfully connected to the GoBox configuration page. If you cannot see this page contact your IT support department to check your IP configuration.

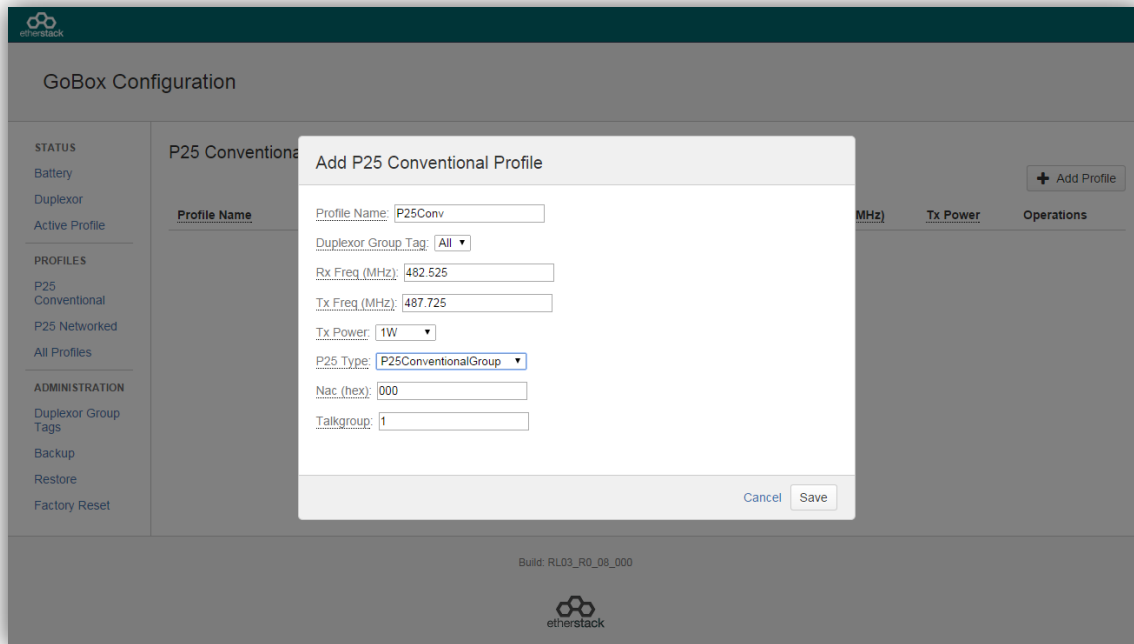
### 3.3 Managing Operational Profiles

GoBox profiles are managed under the **Profiles** heading in the navigation pane.

! If the user enters an invalid value in any form field, the GoBox will reject the profile, and the reason will be displayed on the form in red.

! Hovering over any form field name that has a dotted underline will display a popup tip to assist completing the form.

#### 3.3.1 Adding a P25 Conventional Repeating Profile



To create a new P25 Conventional Profile, click the **P25 Conventional** menu item in the navigation pane and click on **+ Add Profile** button on the content pane.

The following fields will be required to be completed.

Field	Description
Profile Name	Create a unique profile name that will appear in the Status Window of the GoBox control interface. This name is what your operational profile will be called. The Profile Name is limited to 8 characters and may only include letters, numbers or a hyphen '-'.
Duplexor Group Tag	If Duplexor Group Tags have been created, you can select a Duplexor Group to associate this profile with. Selecting a specific Duplexor tag means this profile will only be available on the GoBox control interface if the corresponding Duplexor is installed. If Duplexor Group Tags have not been created, you can select <b>All</b> and then edit the profile once Duplexor Group tags have been created. Selecting <b>All</b> means this profile option will always be available to select on the GoBox control interface regardless of what Duplexor is installed. Once an operational profile is associated with a Duplexor Group Tag, it may also be chosen as the default start-up profile for a Duplexor.
Rx Frequency	This should be set to the desired centre receive frequency. The installed duplexer must be calibrated to this frequency to ensure optimal RF performance.
Tx Frequency	This should be set to the desired centre transmit frequency. The installed duplexer must be calibrated to this frequency to ensure optimal RF performance.
Tx Power	The transmit power in Watts to use for this operational profile.
Site ID	The Site ID indicates the identity of the P25 site and is inserted into over-the-air traffic. The Site Id must be unique within an RFSS when the GoBox is used in Network mode. The Site ID is limited to values between 0 and 255 (decimal).



Field	Description						
Duplexor Group Tag	<p>If Duplexor Group Tags have been created, you can select a Duplexor Group to associate this profile with. Selecting a specific Duplexor tag means this profile will only be available on the GoBox control interface if the corresponding Duplexor is installed.</p> <p>If Duplexor Group Tags have not been created, you can select <b>All</b> and then edit the profile once Duplexor Group tags have been created. Selecting <b>All</b> means this profile option will always be available to select on the GoBox control interface regardless of what Duplexor is installed.</p> <p>Once an operational profile is associated with a Duplexor Group Tag, it may also be chosen as the default start-up profile for a Duplexor.</p>						
Rx Frequency	This should be set to the desired centre receive frequency. The installed duplexer must be calibrated to this frequency to ensure optimal RF performance.						
Tx Frequency	This should be set to the desired centre transmit frequency. The installed duplexer must be calibrated to this frequency to ensure optimal RF performance.						
Tx Power	The transmit power in Watts to use for this operational profile.						
Site ID	<p>The Site ID indicates the identity of the P25 site and is inserted into over-the-air traffic. The Site Id must be unique within an RFSS when the GoBox is used in Network mode.</p> <p>The Site ID is limited to values between 0 and 255 (decimal).</p>						
P25 Type	<p>The P25 Type field indicates the level of filtering the GoBox will apply to a received signal before repeating the signal.</p> <table border="1"> <tbody> <tr> <td><i>P25ConventionalMonitor</i></td> <td>All detected P25 signals will be repeated. A user specified NAC will be used for transmission.</td> </tr> <tr> <td><i>P25ConventionalNAC</i></td> <td>The GoBox will unsquelch on a NAC code</td> </tr> <tr> <td><i>P25ConventionalGroup</i></td> <td>The GoBox will unsquelch on both a NAC code and a Talkgroup Id</td> </tr> </tbody> </table>	<i>P25ConventionalMonitor</i>	All detected P25 signals will be repeated. A user specified NAC will be used for transmission.	<i>P25ConventionalNAC</i>	The GoBox will unsquelch on a NAC code	<i>P25ConventionalGroup</i>	The GoBox will unsquelch on both a NAC code and a Talkgroup Id
<i>P25ConventionalMonitor</i>	All detected P25 signals will be repeated. A user specified NAC will be used for transmission.						
<i>P25ConventionalNAC</i>	The GoBox will unsquelch on a NAC code						
<i>P25ConventionalGroup</i>	The GoBox will unsquelch on both a NAC code and a Talkgroup Id						
NAC	<p>The NAC is a feature similar to CTCSS or DCS for analogue radios. Repeaters can be programmed to only repeat P25 signalling when receiving the correct NAC.</p> <p>NACs are programmed as a three-hexadecimal-digit code that is transmitted along with the digital signal being transmitted.</p> <p>Three of the possible NACs have special functions</p> <table border="1"> <tbody> <tr> <td><i>0x293 (\$293)</i></td> <td>the default NAC</td> </tr> <tr> <td><i>0xf7e (\$F7E)</i></td> <td>a repeater set for this NAC will repeat P25 signalling on any decoded signal received</td> </tr> <tr> <td><i>0xf7f (\$F7F)</i></td> <td>a repeater set for this NAC will allow all incoming decoded signals and the repeater transmitter will retransmit the received NAC</td> </tr> </tbody> </table>	<i>0x293 (\$293)</i>	the default NAC	<i>0xf7e (\$F7E)</i>	a repeater set for this NAC will repeat P25 signalling on any decoded signal received	<i>0xf7f (\$F7F)</i>	a repeater set for this NAC will allow all incoming decoded signals and the repeater transmitter will retransmit the received NAC
<i>0x293 (\$293)</i>	the default NAC						
<i>0xf7e (\$F7E)</i>	a repeater set for this NAC will repeat P25 signalling on any decoded signal received						
<i>0xf7f (\$F7F)</i>	a repeater set for this NAC will allow all incoming decoded signals and the repeater transmitter will retransmit the received NAC						
Talkgroup (optional)	The GoBox may be configured to only repeat P25 signals matching a certain Talkgroup Id. Allowed values are 1 to 65535 inclusive.						
IP Address	IP Address the GoBox will use when this operational profile will be selected. The GoBox will reconfigure its network interface and IP address to this value when selected.						
Subnet mask	The subnet mask the GoBox will use when this operational profile is selected.						
Default gateway	The default gateway the GoBox will use when this operational profile is selected.						
Site Subscriber Id	The site subscriber ID is used to register and affiliate with the RNC to allow multisite conventional repeating. The value should be unique and homed to an RFSS.						
RFSS Id	<p>P25 Radio Frequency Sub-System Id.</p> <p>Allowed values are hexadecimal (00 to FF)</p>						
WACN	<p>P25 Wide Area Communications Network ID.</p> <p>Allowed values are hexadecimal (00000 to FFFFF)</p>						
System Id	<p>P25 System ID.</p> <p>Allowed values are hexadecimal (000 to FFF)</p>						
Group Id	<p>P25 Network Talkgroup ID.</p> <p>Allowed values are hexadecimal (0000 to FFFF)</p>						
RNC IP Address	The static IP Address of the RNC in the IP network that the GoBox will register with.						

Once the form has been completed, press the **Save** button to save the profile or **Cancel** to abort the operation.



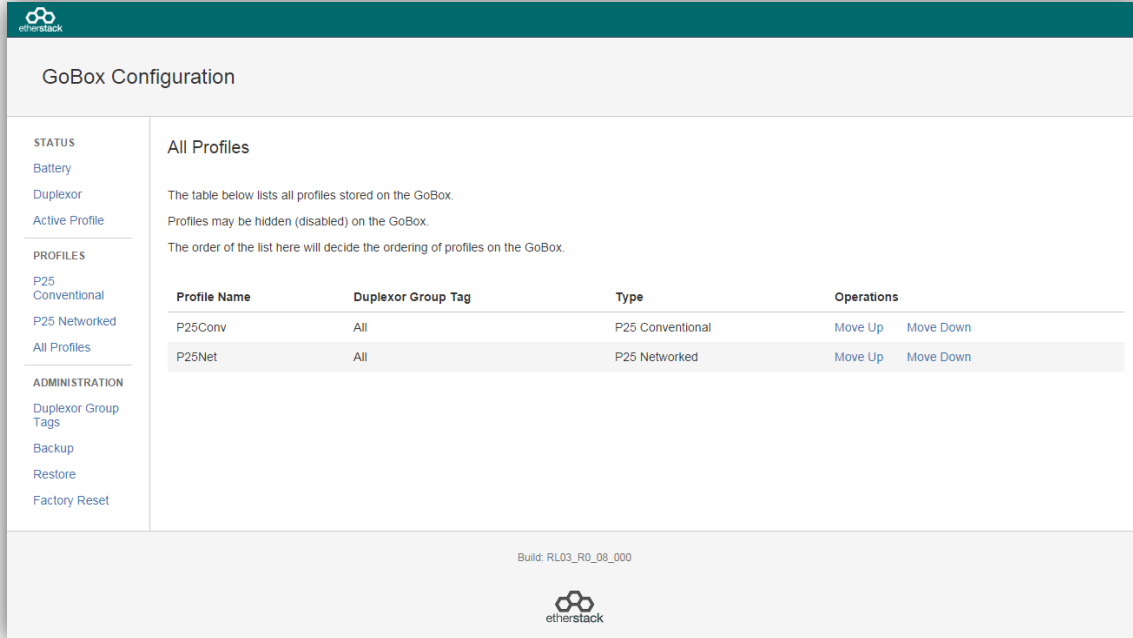
Once save is pressed the profile is written to the GoBox.





Once this operational profile is selected, the IP address of the GoBox Web Interface will also change to the new IP address. To re-connect to the GoBox Web Interface at <http://172.16.10.1> turn the rotary dial on the control interface until “Ready” is displayed in the Status Window.

### 3.3.3 Setting the Operational Profile Order



**GoBox Configuration**

**STATUS**  
Battery  
Duplexor  
Active Profile

**PROFILES**  
P25  
Conventional  
P25 Networked  
All Profiles


**ADMINISTRATION**  
Duplexor Group Tags  
Backup  
Restore  
Factory Reset

**All Profiles**

The table below lists all profiles stored on the GoBox.  
Profiles may be hidden (disabled) on the GoBox.  
The order of the list here will decide the ordering of profiles on the GoBox.

Profile Name	Duplexor Group Tag	Type	Operations	
P25Conv	All	P25 Conventional	Move Up	Move Down
P25Net	All	P25 Networked	Move Up	Move Down

Build: RL03\_R0\_08\_000



If you have created a large number of profiles, it may be useful to set the order in which they appear on the GoBox control interface.

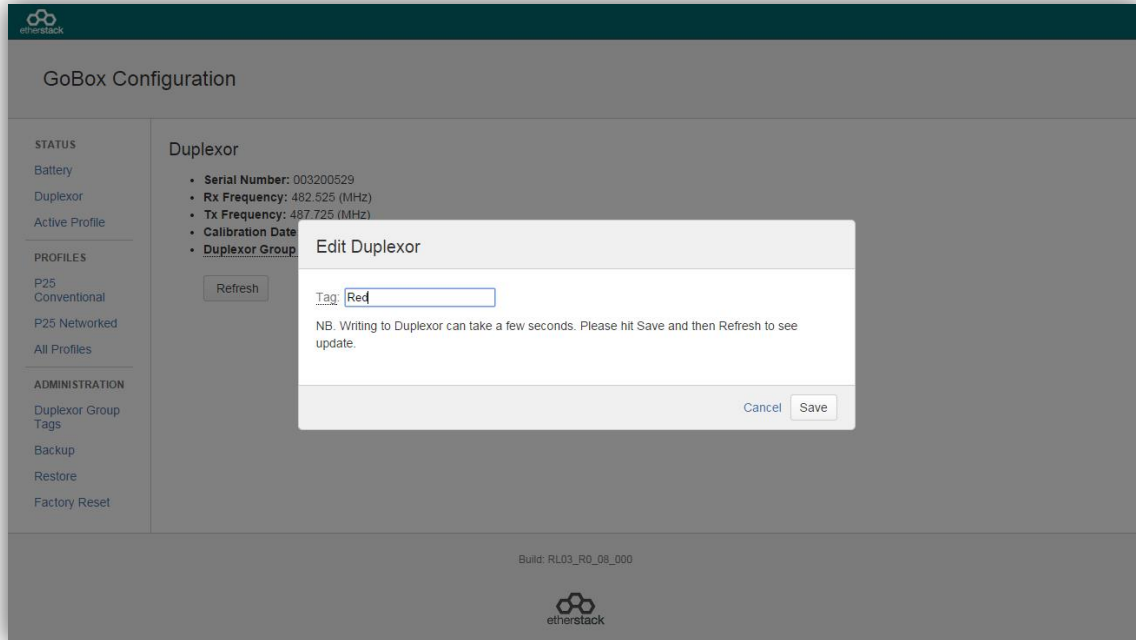
To change the display order, find the profile you want to move in the list and click **Move Up** or **Move Down** to move the operation profile to the required position. The display order on the screen will be the display order on the GoBox control interface.

## 3.4 Managing Duplexers

### 3.4.1 Writing a Duplexer Group Tag

Before the GoBox will recognise a Duplexer and allow operational profiles to be associated with it, you must write a Duplexer Group Tag to the Duplexers internal memory. To do this use the following steps:

Click on the **Duplexer** menu item on the navigation pane and press the **Edit** button on the content pane to show the **Edit Duplexer** form.



The following fields will be required to be completed.

Field	Description
Tag	A unique name for this duplexor group.

Once the form has been completed, press the **Save** button to write to the Duplexer or **Cancel** to abort the operation.



Writing to the Duplexer will take several seconds. It is necessary to hit the **Refresh** button to verify the tag has been written.

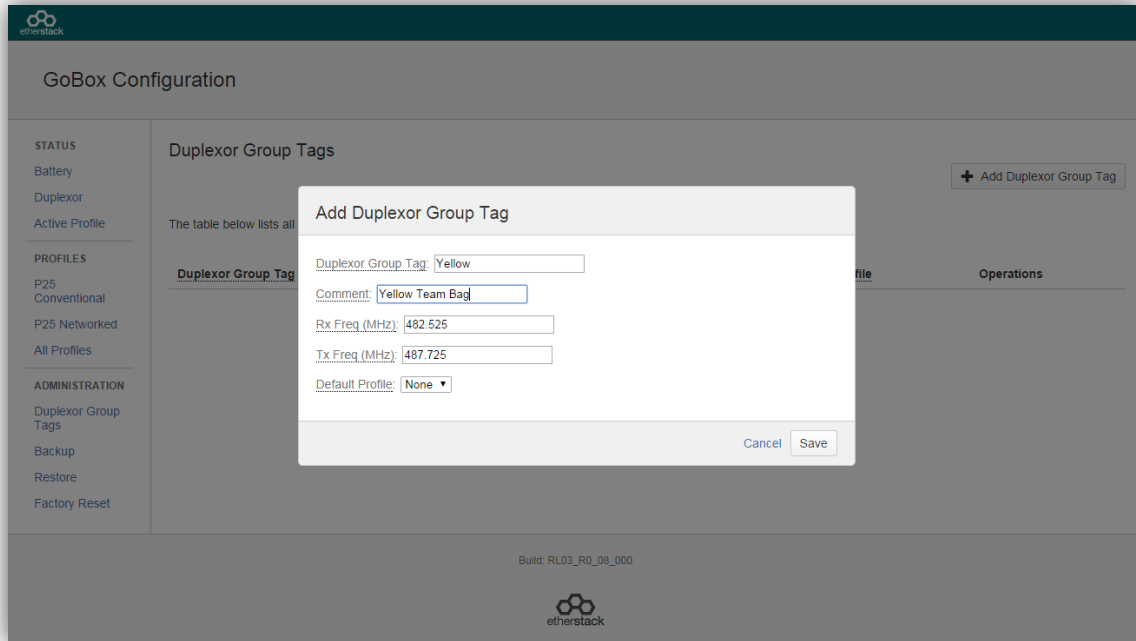
### 3.4.2 Setting the start-up profile for a Duplexer

To define different start-up profiles for different Duplexers use the following steps:



At least one operation profile is required.

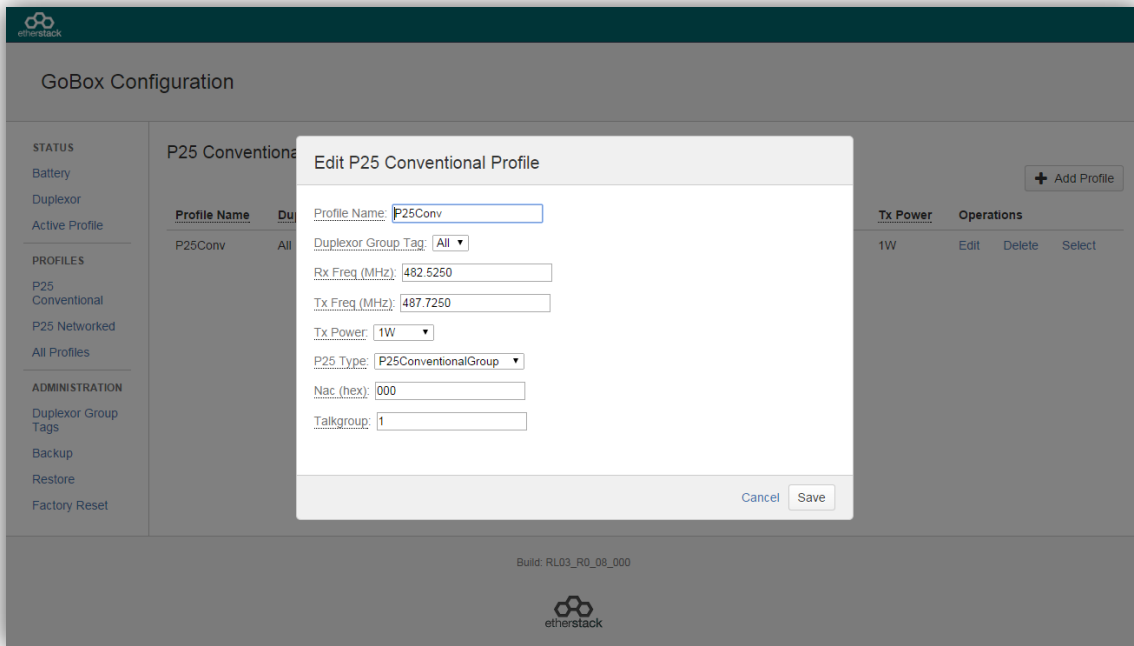
Click on the **Duplexor Group Tags** menu item on the navigation pane and press the **+ Add Duplexor Group Tag** button on the content pane to show the **Add Duplexor Group Tag** form.



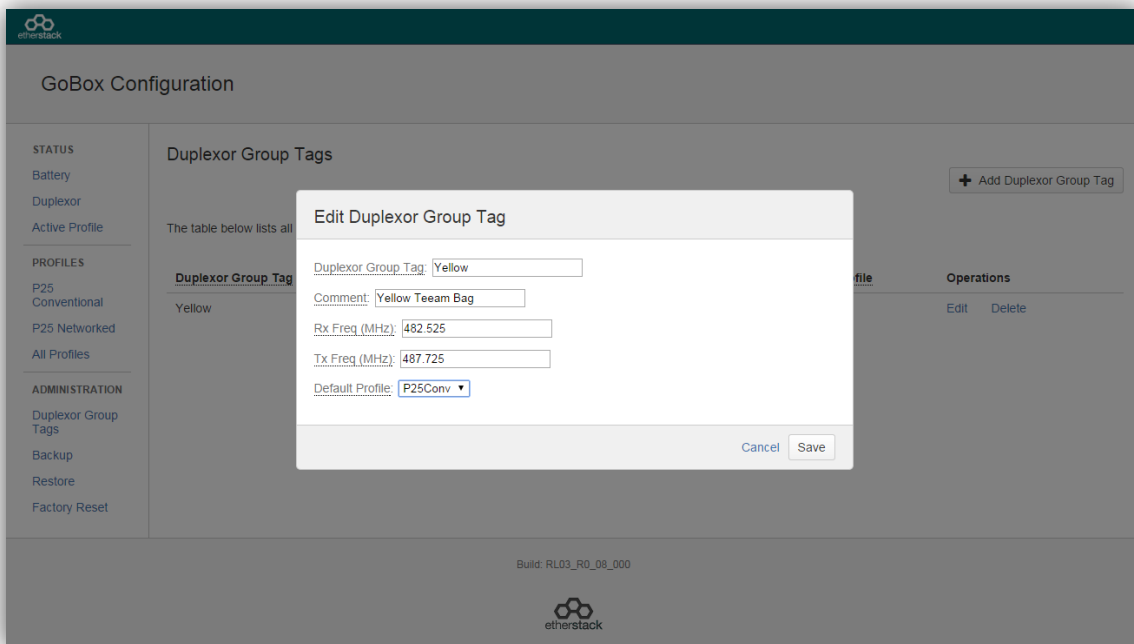
The following fields will be required to be completed.

Field	Description
Duplexor Group Tag	A unique name for this duplexor group.
Comment (Optional)	An optional comment describing this duplexor group tag.
Rx Freq	The receive frequency of the duplexor group
Tx Freq	The transmit frequency of the duplexor group
Default Profile	The operational profile to be selected on powerup when this duplexor tag is found.

Create or edit each operational profile, and link it to a specific Duplexor by setting the **Duplexor Group Tag** field.



Back in the **Duplexor Group Tag** menu item, select a start-up profile for each Duplexor.



The background is a solid teal color. On the left side, there is a vertical strip of a lighter teal color. Overlapping this strip and extending into the main teal area are several hexagonal shapes. The central hexagon is the largest and is a lighter shade of teal. It is surrounded by other hexagons of varying sizes and shades, creating a geometric pattern.

# **4 Using the GoBox**

## 4.1 Turning your GoBox On

The GoBox will automatically turn on when AC or DC power is first applied or a battery is inserted with sufficient charge.

If a power source has already been connected and the GoBox was previously turned off via the GoBox Power Button, pressing and holding down the Power button will turn the GoBox on.



The power button must be held down for several seconds to turn the GoBox on and off. This is a feature to avoid accidental power-on/off.

During the GoBox's power-on self-test, the Status Window backlight and all control panel LEDs will turn on briefly to indicate these subsystems are fully operational.

During the GoBox's power-on self-test, the Power LED will flash to indicate that power is supplied but the GoBox is not ready for use.

After approximately 30 seconds, the Power LED will turn solid indicating that the GoBox is ready for use if a suitable operational profile can be found otherwise the Power LED will continue to flash and the word Ready displayed in the GoBox status window.



If the GoBox displays Ready in the Status Window, the GoBox cannot find a default profile. You will need to attach your laptop/PC to the programmer to address the issue.

If operational profiles have been programmed into the GoBox, and a valid operational profile found, this operational profile will be selected and the GoBox will be ready for operation, indicated by a solid Green LED.

## 4.2 Selecting an Operational Profile

Once the GoBox has been programmed with operational profiles, you can change the operating profile by pressing the rotary dial and turning to select the required profile.

During profile changes, the GoBox will perform a soft reset, indicated by a flashing Power LED. When the Power LED returns to a solid state the operational profile will have been loaded and the GoBox is ready for use.



The GoBox will always power up using your programmed default profile.

## 4.3 Checking GoBox Status

The GoBox displays several indicators in the Status Window such as power source, battery state and active operational profile and if a laptop/PC is connected additional status information can be viewed.

### 4.3.1 Status Window

#### 4.3.1.1 Checking Battery Status

Two rectangles will appear in the top right hand corner of the Status Window to indicate if any of the batteries are detected in the battery compartment.

A solid rectangle indicates a battery is inserted and is fully charged. A partially filled rectangle indicates the remaining battery charge. When a battery has no charge remaining it will be represented as an empty rectangle.

The GoBox has a built in battery charger and when AC or DC power is available, any batteries detected in the GoBox will be charged and will be indicating by a scrolling battery charge image.



An external battery charger is also available

#### 4.3.1.2 Checking External Power Source

The letters AC and/or DC will appear in the bottom right hand corner of the Status Window to indicate if any external power source is detected.



Both power sources can be connected at the same time.

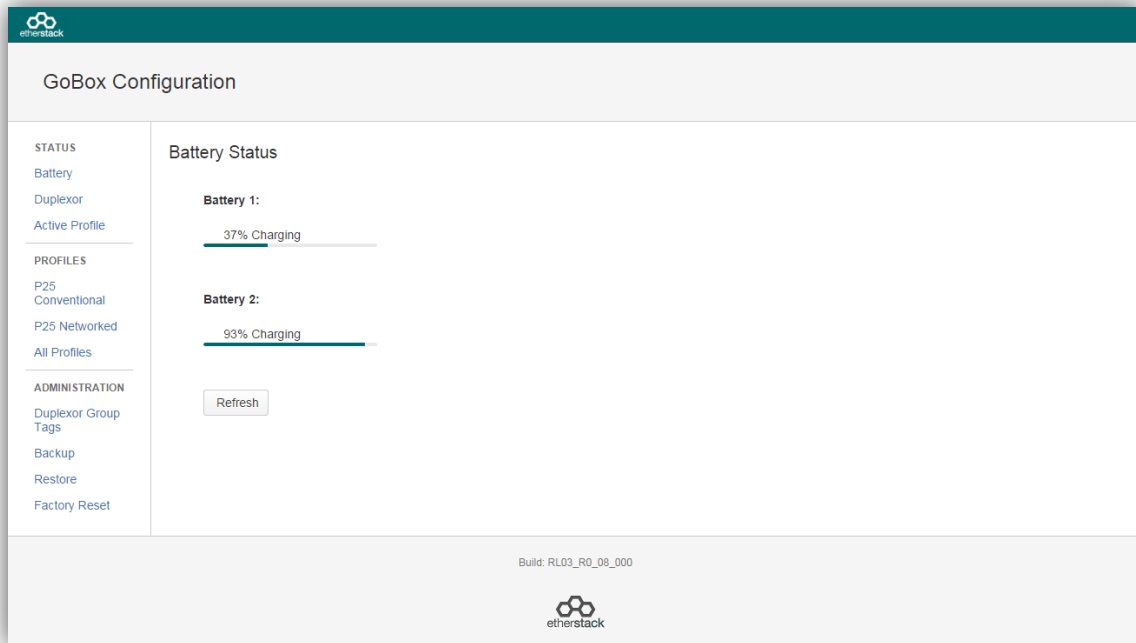
### 4.3.1.3 Checking the current operational profile

The GoBox will display the current operational mode in the status window after power up.

If the GoBox displays Ready in the Status Window, the GoBox is in programming mode and awaiting a connection from a laptop or PC otherwise the GoBox will display the current operational profile.

## 4.3.2 Web configuration interface

### 4.3.2.1 Checking Battery Status



To access this page, click on the **Battery** menu item on the navigation pane.

The battery status page will show if a battery is installed, each batteries current charge percentage and if the internal GoBox battery charger is active.

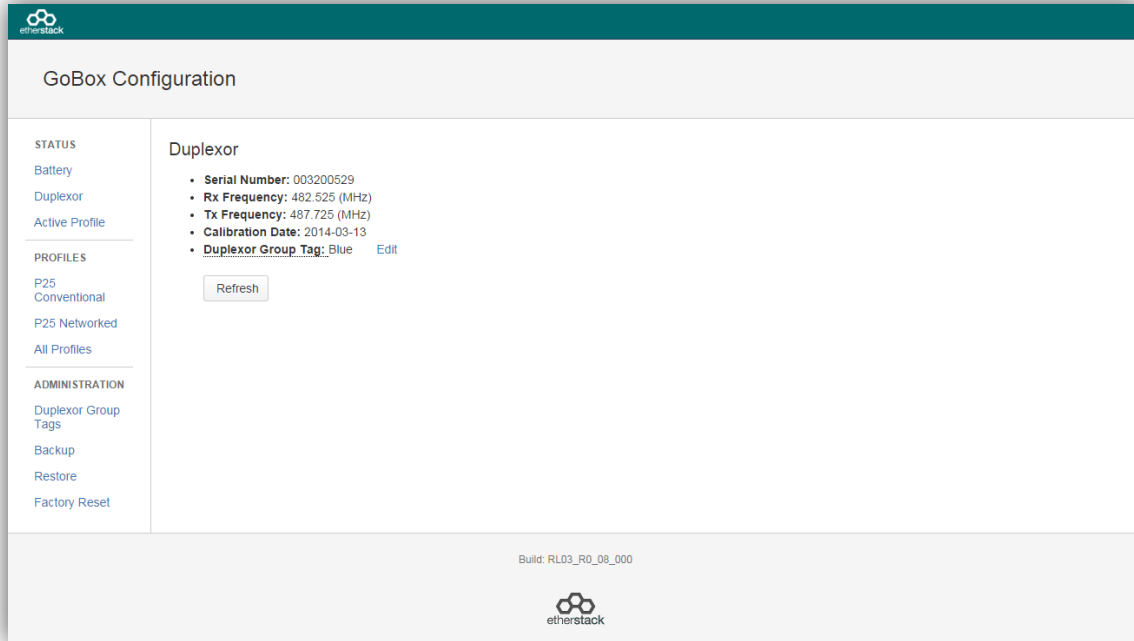


To update the page with the latest information press the **Refresh** button.



The battery charger will only operate when an AC or DC power source is applied and will automatically turn off to protect the battery once full charge has been reached.

### 4.3.2.2 Checking Duplexor Status



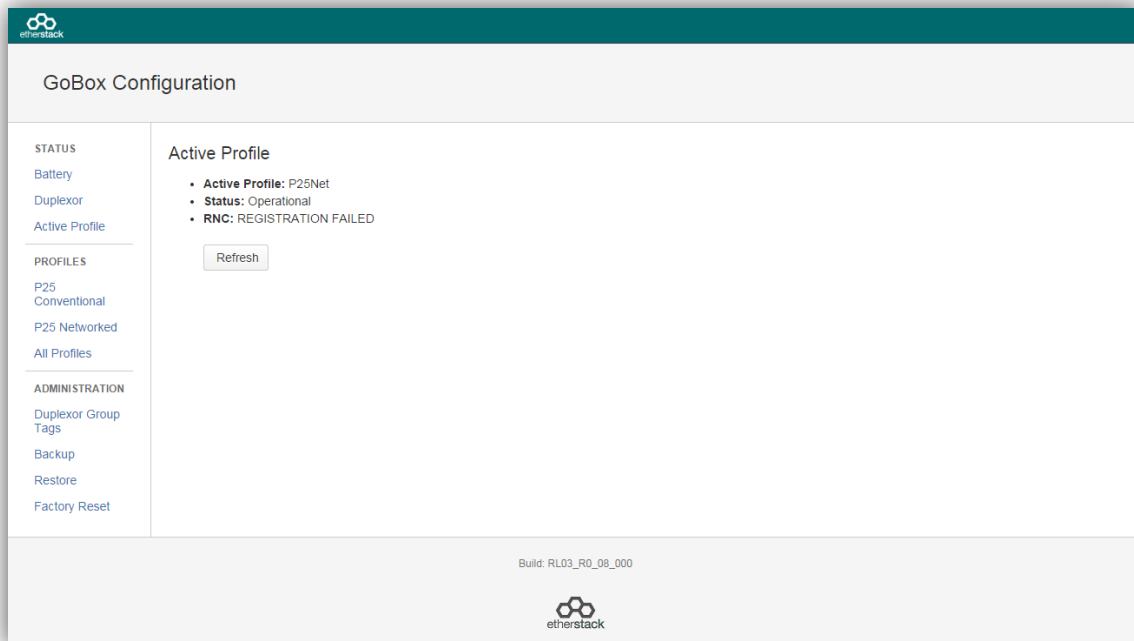
To access this page, click on the **Duplexor** menu item on the navigation pane.

The duplexor status page will show the duplexor serial number, receive centre frequency, transmit centre frequency, date last calibrated and the duplexor group tag used to link a duplexor to a start-up operational profile.



To update the page with the latest information press the **Refresh** button.

### 4.3.3 Checking Active Profile



To access this page, click on the **Active Profile** menu item on the navigation pane.



The active profile status page will show:

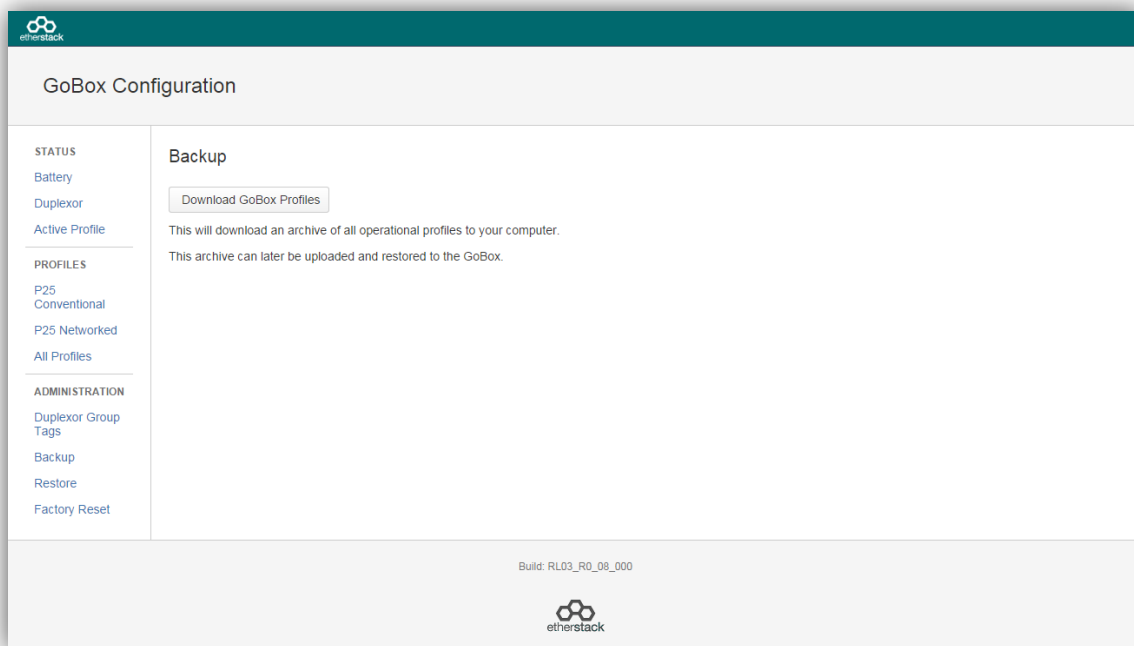
- Active Profile: The active profile name. This will match what is shown on the GoBox LCD.
- Status: Will show **Loading** whilst the profile is being loaded. Once the profile is ready, **Operational** will be displayed.
- RNC: Valid only if the profile is a P25 networked profile. Displays whether or not the GoBox has successfully connected to the RNC.



To update the page with the latest information press the **Refresh** button.

## 4.4 Administration

### 4.4.1 Backing up your GoBox Configuration

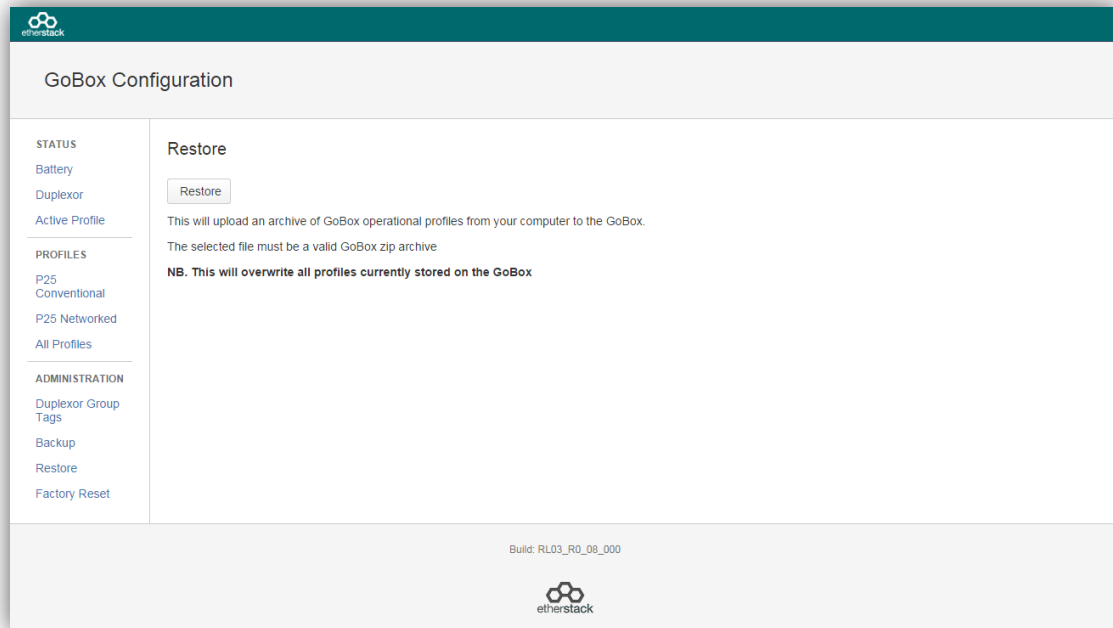


To back-up your GoBox configuration to your local computer, click the **Backup** menu item on the left hand navigation pane and click on the **Download GoBox Profiles** button in the content pane.

A specially constructed zip file containing all GoBox profiles will be downloaded to the Download folder of your local computer. This file should be archived and stored in a safe place.

This configuration file can be used to restore the configuration on any GoBox and/or program future GoBox's.

## 4.4.2 Restoring your GoBox Configuration from a Backup



To restore a GoBox profile, click the **Restore** menu item on the left hand navigation pane and click on the **Restore** button in the content pane.

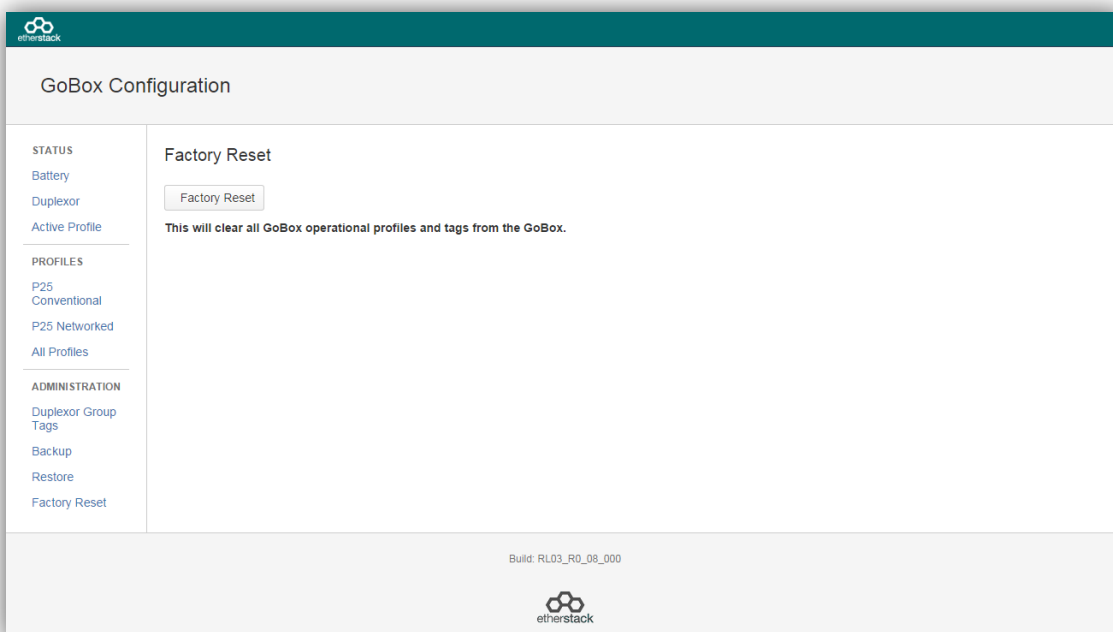
A file browser will then be displayed where you can select a previously backed up configuration file.



This will overwrite all profiles currently stored on the GoBox

## 4.4.3 Clearing the Gobox Configuration from memory

To clear all GoBox profile and Duplexor information, click the **Factory Reset** menu item on the left hand navigation pane and click on the **Factory Reset** button in the content pane.



This will clear all profiles currently stored on the GoBox

The background is a solid teal color. On the left side, there is a vertical strip of a lighter teal color. Overlaid on this is a pattern of hexagons. A large, semi-transparent teal hexagon is centered horizontally and vertically. To its left, there are three smaller, semi-transparent teal hexagons arranged vertically, partially overlapping the large central one.

# **5 Troubleshooting**

## 5.1 Cannot connect to the GoBox Web Interface

Ensure a functioning Ethernet cable is connected to the GoBox from your PC/Laptop and check the Ethernet activity lights are on/flashing on the GoBox Ethernet connector.

Ensure that the GoBox LCD displays the "Ready" string. This guarantees that the IP address configuration will be set to the default of 172.16.10.1

If the GoBox does not display "Ready", rotate the rotary dial until the Status Window displays "Ready".

Verify there is network connectivity between your PC and the GoBox on the 172.16.10.1 subnet. (Request help from your System Administrator if required)

## 5.2 Status Window displays No IGEP

Power-cycle the GoBox and if the problem persists turn the GoBox off and remove and reinsert the control module. If the error still is present when power is reapplied, contact support.

## 5.3 Status Window display Err: xr1 or Err: xr2

Power-cycle the GoBox and if the problem persists turn the GoBox off and remove and reinsert the radio module. If the error still is present when power is reapplied, contact support.

## 5.4 There are no profiles to select on the GoBox Control Panel

You need to have at least one profile programmed in your GoBox and if a duplexer tag is configured, the operational profile must have the same tag otherwise it will be hidden.

Check your operational profiles using the web interface and retry.

## 5.5 GoBox Web UI displays "Template Syntax Error"

The GoBox profile and Duplexor information may have become corrupted due to a power or network loss during configuration.

If this occurs, please either restore your operational profiles from a backup or perform a Factory Reset using the web interface.



# **6 Glossary**

Term	Definition
<b>APCO</b>	Association of Public-Safety Communications Officials
<b>AVL</b>	Automatic Vehicle Location
<b>MMI</b>	Man Machine Interface
<b>NAC</b>	Network Access Code
<b>OTAR</b>	Over the Air Rekeying
<b>PTT</b>	Push-To-Talk
<b>P25</b>	Project 25
<b>RFSS</b>	Radio Frequency Sub-System
<b>RNC</b>	RFSS Network Controller
<b>SFFR</b>	Small Form Factor Repeater
<b>WACN</b>	Wide Area Communications Network

**Asia Pacific Headquarters****Etherstack Pty Ltd**

Level 1, 80 Abercrombie Street

Sydney NSW 2008

AUSTRALIA

**Ph:** +61 2 8399 7500**Fax:** +61 2 8399 7507[info.au@etherstack.com](mailto:info.au@etherstack.com)**European Headquarters****Etherstack Limited**

1st Floor, 28 Poland Street

London, W1F 8QN

UNITED KINGDOM

**Ph:** +44 20 7734 0200**Fax:** +44 20 7437 1505[info.eu@etherstack.com](mailto:info.eu@etherstack.com)**Etherstack Japan****Etherstack Japan**

12F Daiwa Jisho Building

74-1 Yamashita-cho Naka-ku

Yokohama Kanagawa 231-0023

JAPAN

**Ph:** +81 45 342 9050**Fax:** +81 45 342 9053[info.jp@etherstack.com](mailto:info.jp@etherstack.com)**North American Headquarters****Etherstack Inc**

The Radio Wave Building

49 W. 27th Street 10th Floor East

New York, NY 10001

UNITED STATES

**Ph:** +1 917 661 4110**Fax:** +1 212 255 3610[info.na@etherstack.com](mailto:info.na@etherstack.com)

**Copyright © 2014 Etherstack London Limited and Auria Wireless Pty Ltd Under License. All rights reserved.**

No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from Etherstack London Limited or Auria Wireless Pty Ltd.

All copyright, confidential information, patents, design rights and all other intellectual property rights of whatsoever nature contained herein are and shall remain the sole and exclusive property of Etherstack London Limited. The information furnished herein is believed to be accurate and reliable. However, no responsibility is assumed by Etherstack London Limited for its use, or for any infringements of patents or other rights of third parties resulting from its use.

The name Etherstack London Limited and Etherstack logo are trademarks or registered trademarks of Etherstack London Limited. The name Auria Wireless Pty Ltd and logo are trademarks or registered trademarks of Auria Wireless Pty Ltd.

All other trademarks are the property of their respective owners.