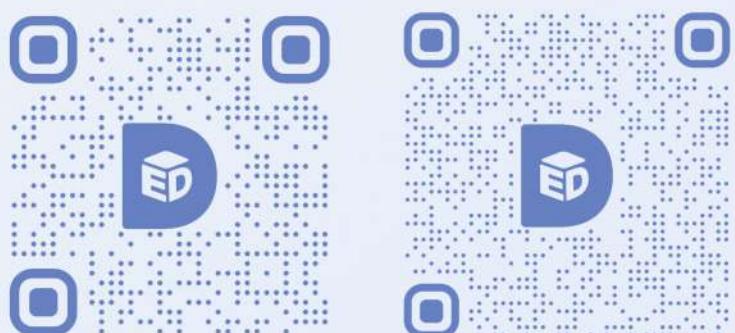


# **DeliverED** **Home**

*A Smart Mailbox For All Your Delivery Needs.*

## User Guide

Latest revision: 29 March, 2021



DeliverED Website  
[group19.sdp.inf.ed.ac.uk](http://group19.sdp.inf.ed.ac.uk)

Online User Guide  
[group19.sdp.inf.ed.ac.uk/user-guide.html](http://group19.sdp.inf.ed.ac.uk/user-guide.html)

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# 1 Overview

## 1.1 Features of The DeliverED Home System

**Simple Parcel Drop-Offs for Couriers:** We have ensured that our mailboxes are simple and efficient for couriers to use, as we recognise that they are on tight schedules and don't have time to mess with a complicated device. Couriers simply push a clearly labelled button on the mailbox, which opens the drop-off compartment.

**Device Locking:** All devices come with the option to lock the drop-off compartment, preventing any deliveries to your mailbox. This can be useful for when you are not expecting any deliveries, and also automatically occurs when your mailbox is full.

**Real-Time App Notifications:** Real-time alerts from our DeliverED app tell you everything you need to know about your mailbox. We let you know immediately when a parcel has arrived, when your device is low on charge, and when your mailbox is full. Our app also provides multiple security alerts, so you can rest easy knowing your parcels will be safe when you return home.

**Intuitive Device Interaction:** The primary interactions you will have with our mailboxes will be to lock and unlock them. We have ensured that performing these actions is a simple and intuitive process, taking accessibility and usability into heavy consideration. The device doors can be controlled with the push of a clearly labelled button on our App.

**Secure Parcel:** Compartment Separate from Delivery Compartment Once a parcel has been dropped into the mailbox by a courier, it is transferred into a separate secure compartment, only accessible via our DeliverED app. This prevents any previously delivered parcels from being removed during delivery.

**UV Parcel Sanitation:** The secure compartment of each device comes with safe built-in UV light, which effectively sanitises your parcels without damaging them.

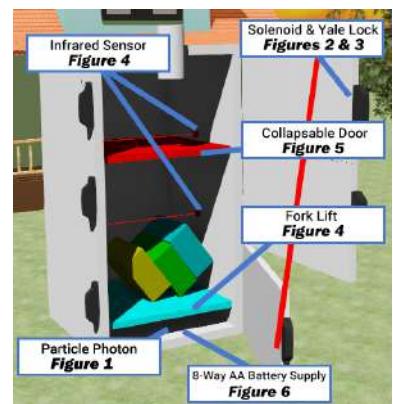
**Long Battery Life:** All DeliverED devices come with a long-lasting battery, and an in-built safety mechanism to ensure that even if your device runs out of charge, your parcels will be protected. An electromagnetic lock ensures that upon power failure, the mailbox remains locked. Our app will notify you when your battery is low, and we provide cheap and easy battery replacement services, so you won't be caught off guard.

**Tamper Proof Devices:** All our devices are made of tough materials, making them both tamper and weather resistant. Our mailboxes fit securely to your wall or floor, and this coupled with real-time security alerts via our App gives you what we hope to be total confidence in the safety of your parcels.

**Simple Device Ownership Customization:** In the event that you are away from home for extended periods of time, we recognise that it may be necessary for someone else to collect your parcels for you. Both for this reason, and to accommodate shared households, we have implemented shared mailboxes. You can easily add and remove other registered DeliverED customers from your device's permissions, enabling them to open and close your device via the App on their own mobile device.

## 1.2 Functionality Overview

Your DeliverED Home mailbox is made up of two sections – the delivery and secure sections. The delivery section is the top door of the device where packages can be placed inside to be delivered. This section can be locked by your app to prevent deliveries if you're not expecting any. The secure section is where your packages are stored, accessed via the bottom door. This door is always locked, unless opened via the DeliverED app or emergency manual key. Inside you'll find your packages neatly piled up on top of a lift mechanism that is used during the delivery process. How to perform actions using the app are detailed under the 'Software Operation' (Section 2.3).



### 1.3 Functionality Breakdown

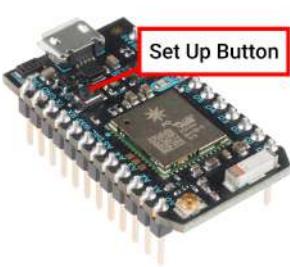


Figure 1: Particle Photon

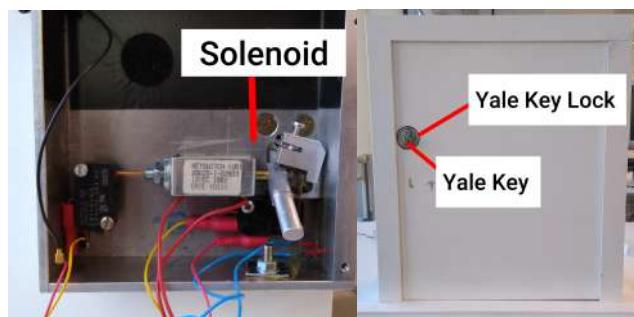


Figure 2: Solenoid Lock

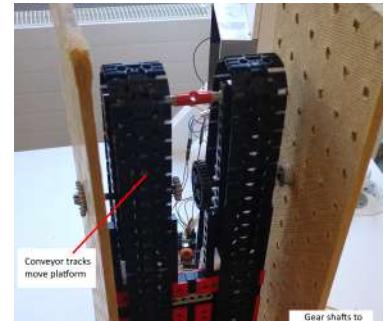


Figure 3: Yale Key Lock

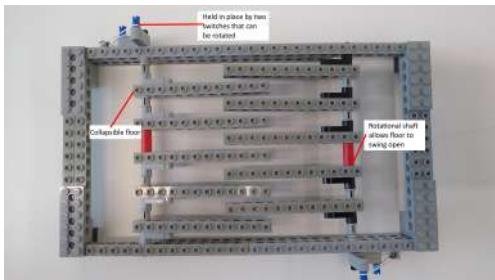


Figure 5: Bascule Collapsible Door

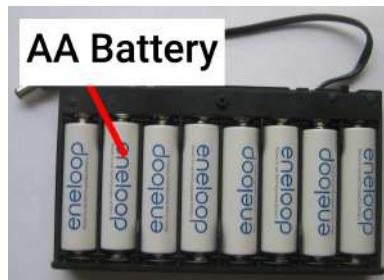


Figure 6: 8-Way AA Battery Supply

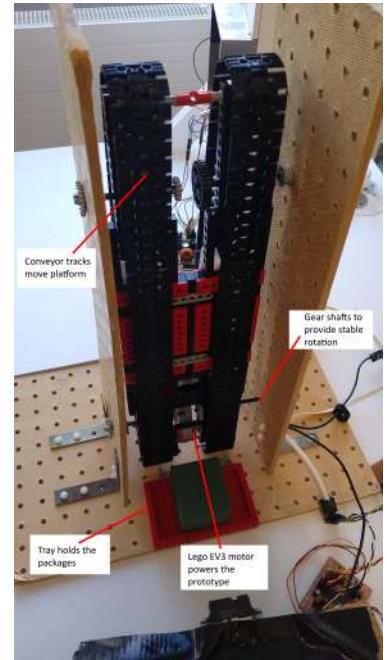


Figure 4: Forklift

**Particle Photon Microcontroller:** (See Figure 1) The brains of the device, this tiny IoT device communicates with the cloud to allow you to talk to your mailbox from the DeliverED app. It is fixed below the lift, and you will find many internal wires connected to it.

**Collapsible Floor:** (See Figure 5) The floor of the delivery section works as a trapdoor, consisting of some rotating shafts and a spring mechanism. When released, a package falls through to the secure section.

**Lift Mechanism:** (See Figure 4) The moving platform is attached to the back of the device, where a Lego EV3 motor powers several shafts which rotate to move two tank-style tracks up and down. The platform is attached to these, moving with them.

**Solenoid:** (See Figure 2) There are two of these in the system, one for each door. They function as the locks on the device, controlled electronically to either pull in or push out a small metal rod which controls the state of the doors.

**Infrared Sensor:** (See Figure 4) These are used to detect when a package is in the way, allowing for internal calculations of when to stop the platform from rising any further.

**Yale key mechanism:** (See Figure 3) This functions as the emergency manual unlock for the secure section. When the correct key is inserted, the door is unlocked. This overrides any signal being given to the solenoid and is primarily used if the system has run out of power.

**8-Way AA Power Supply:** (See Figure 6) The is what powers the the Particle Photon and all the components of the mailbox - the infrared sensors, the solenoid lock, the forklift and the collapsible door.

**Delivery button:** This is visible on the outside of the device and is a simple button that when pressed sends a signal to the Photon. This triggers a function within the device that begins the delivery sequence so long as it also detects that the delivery door is locked.

## 2 Installation and Operation

### 2.1 Installation

When your DeliverED Home mailbox arrives, it is highly recommended that you call one of our expert handyperson to install it for you. For a small fee, this will handle everything from getting your device securely attached to a wall or the ground to prevent theft as well as setting up the internal micro-controller to connect to your home Wi-Fi. If you would rather perform the installation yourself however, full instructions on everything required to get your device up and running are detailed below. These are the same instructions our handymen will follow when setting up your device for you.

*You will need:*

- DIY tools (A drill, bolts to secure the device, etc.)
- An Android mobile phone (running Android 5 (Lollipop)<sup>1</sup> +)

#### Step 1: Physical Installation

The DeliverED Home mailbox is heavy, but to prevent a would-be thief from simply taking the whole device, we highly recommend the first step to be securely bolting it into either a wall or the ground. Ensure that your chosen bolting method is secure and does not interfere with the internal workings of the device such as the lift. You will then need to turn on the internal power supply, which can be done at the flick of an internal switch.

#### Step 2: Micro-Controller Setup

Inside your mailbox, you will find a small area beneath the lift which contains the key electronics of the device, including a Particle Photon, a small microcontroller that works as the brains of the device. For this step you will need to download the Particle app and sign into it. Once you are logged in, press the small SETUP button (see Figure 1) on the micro-controller until the light begins to blink blue. Then, tap the '+' button on the Particle app and go through Wi-Fi setup. This should add the credentials of your home Wi-Fi to the device, allowing it to function.

#### Step 3: App Installation

Now your device is ready to go, and all you need to do is download our DeliverED app to use it! Once you are signed into the app, you will need to use the claim code which you should have received alongside the device. For advice on adding your device using the app, please see ‘Managing Your Devices’ (Section 2.3.2) under Software Operation.



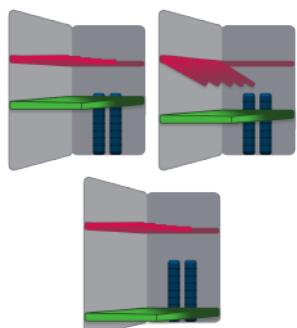
## 2.2 Hardware Operation

### Delivering a package

When a mailperson arrives to deliver a package, the process is simple. First, they will open the upper door and place the package inside the delivery section. Next, the door is then closed again and once done they may press the ‘deliver’ button on the front of the device. This is all the input required to deliver a package, unless the mailbox is full or otherwise locked.

Internally, the delivery process is as follows:

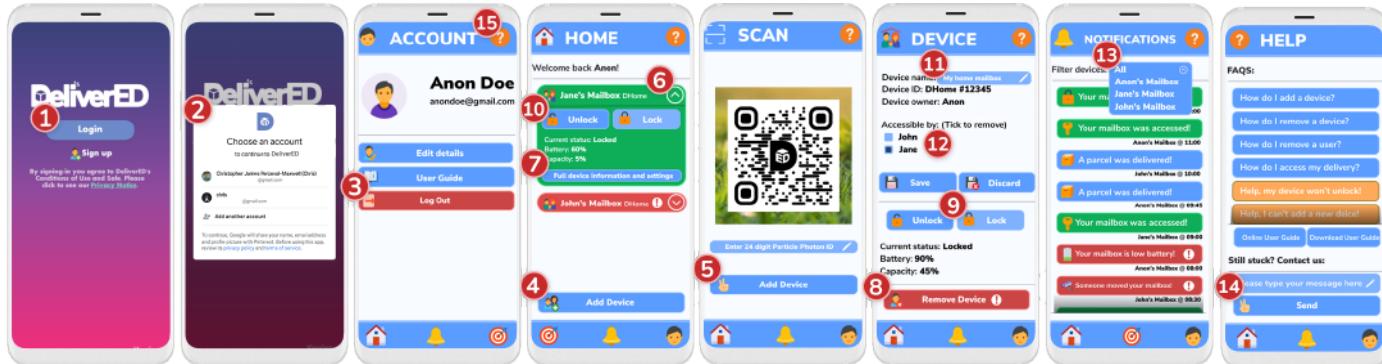
1. Deliver button is pressed and delivery door locked.
2. Internal lift is raised to its maximum height, taking into account existing packages. This height is detected via an infrared sensor on the inside. [Watch](#).
3. Trapdoor is unlocked, dropping the package a very short distance onto the lift platform.
4. Internal lift is lowered all the way down. [Watch](#).
5. Trapdoor is closed, and the delivery door unlocked. [Watch the entire cycle of events](#).



<sup>1</sup> Android Lollipop - Wikipedia, [https://en.wikipedia.org/wiki/Android\\_Lollipop](https://en.wikipedia.org/wiki/Android_Lollipop)

## 2.3 Software Operation

This section will cover how to use the companion Android application. Please refer to the Troubleshooting section if you encounter any issues completing these tasks.



### 2.3.1 Managing Your Account

Navigate to the User Profile by tapping the avatar (right-most) icon on the navigation bar located at the bottom of your screen.

#### Logging In (See items 1 and 2)

Before you can control a device, you need to create an account with us! To do this, we ask you to log into our app using your Google account. Since you are using an Android phone, your phone should remember your login details. If you don't want to use this account, you can choose to log in with a new existing Google account, or create a new one (if you have already made an account with us, just login using the same Google account).

*By logging in, you agree to our [Privacy Policy](#).*

Upon successfully logging in you will be brought to the Device Manager/Home Screen. This is where you can view all the devices (mailboxes) you have connected to your account. If you have just created your account, you will see no devices here yet!

#### Logging Out / Switching Accounts (See item 3)

If you wish to log out of the app, or switch accounts, navigate to your Profile by tapping the avatar (right-most) icon on the navigation bar located at the bottom of your screen. Then tap 'Log Out' and confirm your action! You will be brought back to the login screen.

### 2.3.2 Managing your Devices

Navigate to the Home Screen by tapping the home (left-most) icon on the navigation bar located at the bottom of your screen.

#### Adding A Delivered Home Mailbox (See items 4 and 5)

To add a new mailbox, tap the 'Add Device' button and scan the QR code<sup>2</sup>. This will grab the mailbox's ID and autofill the necessary information all for you! Alternatively, you can type in the ID yourself. Now that you have the device credentials, you can save these options and operate your new mailbox!

#### Removing A Delivered Home Mailbox (See items 6, 7 and 8)

**Proceed with caution** !

Choose the mailbox you wish to proceed with and then, tap the red 'Remove Device' button and confirm your action. You will now see your device is removed from your Home Screen!

#### Accepting Your Deliveries (See items 6, 7 and 9)

In order to accept deliveries, you must keep the 'Delivery Door' unlocked. To do so, choose the mailbox you wish to proceed with and tap the 'Open' button. Your mailbox is now ready to accept deliveries!

#### Prevent Deliveries (See items 6, 7 and 9)

In order to prevent deliveries, you must keep the 'Delivery Door' locked. To do so, choose the mailbox you wish to proceed with and tap the 'Close' button. Your mailbox will no longer accept deliveries!

<sup>2</sup>QR Code - Wikipedia, [https://en.wikipedia.org/wiki/QR\\_code](https://en.wikipedia.org/wiki/QR_code)

## Accessing Your Deliveries (See items 6 and 10)

Choose the mailbox you wish to proceed with and then tap ‘Unlock’. You will now be able to open the delivery door and collect your parcel!

**Important:** Remember to lock your device again by tapping ‘Lock’ located beside ‘Unlock’!

## Change Your Device Name (See items 6, 7 and 11)

Choose the mailbox you wish to proceed with and tap the textbox beside ‘Device name’. Now simply type in what you like! Tap the ‘Save’ button located underneath the users to submit.

## Remove A User With Access To Your Device (See item 12)

Choose the mailbox you wish to proceed with, then tap the checkbox beside a users name. Tap ‘Save’ button located underneath the users to confirm their removal.

### 2.3.3 Mailbox Notifications

(See item 13) Navigate to the Notifications by tapping the bell (middle) icon on the navigation bar located at the bottom of your screen. You can dismiss notifications by swiping them to the left and filter notifications by device via the dropdown!

### 2.3.4 Help

(See items 14 and 15) To find help at any time, tap the ‘?’ at the top right of your screen. Here you can scroll through FAQs and read our full user guide. If you still need help, contact our user support via the text box at the bottom!

## 3 Troubleshooting

### 3.1 Hardware Help

#### 3.1.1 Drop-Off Area Door Open For Too Long

Causes	Solutions
Parcel size bigger than the box	Instruct someone to remove parcel
Door is not shut properly enough for the solenoid to lock in	Instruct someone to push it further
The mailbox is out of power	Replace the battery
The sensor readings are extremely noisy/sensors are broken	You will notice that in such a case you will get an alert while the system works fine. <a href="#">Contact hardware support</a>

#### 3.1.2 Secure Compartment Is Open Without Authorisation

Causes	Solutions
Someone who has access to your mailbox has unlocked it	Check with people who have access to your mailbox. (You should be able to lock it yourself using the app.)
You (or people with access to your mailbox) forgot to lock it	Lock it using the app
The mailbox is out of power	Make sure the physical lock is in place. Replace battery.
The sensor readings are extremely noisy/sensors are broken	You will notice that in such a case you will get an alert while the system works fine. <a href="#">Contact hardware support</a>

#### 3.1.3 The Collapsible Door Is Stuck

Causes	Solutions
A parcel is stuck and is unable to get through	Remove the parcel and retry dropping it off
The spring is broken	<a href="#">Contact hardware support</a>
The secure compartment is full and the movable platform cannot move down any further to allow the collapsible platform to close back up	Retrieve parcels from the secure compartment

#### 3.1.4 The Movable Platform Does Not Move As Expected

Causes	Solutions
The mailbox is out of power (the platform won’t move at all)	Replace the battery
The motors are not functioning	<a href="#">Contact hardware support</a>
There is some slippage	<a href="#">Contact hardware support</a>
The infrared sensor in the secure compartment is broken/returns faulty feedback	<a href="#">Contact hardware support</a>

### 3.1.5 The App Will Not Operate The Secure Compartment / Drop-Off Area Locks

Causes	Solutions
The mailbox is out of power (the platform won't move at all)	Replace the battery.
The solenoid is not working properly or is broken	<a href="#">Contact hardware support</a>

## 3.2 Software Help

### 3.2.1 Unable To Login / Logout

Causes	Solutions
Invalid email and/or password	Ensure you've typed in the email and password correctly. If needed, reset your Google password
Google services are down	<a href="#">Contact Google's support</a> and keep an eye on <a href="#">this website</a> to see if Google services are currently down
No internet connection	Ensure you're have a strong Wi-Fi or data connection

### 3.2.2 Can't Add New Device

Causes	Solutions
QR Code won't scan	Ensure the area is well lit and the whole QR Code is in the camera frame
Wrong ID	If you have manually entered in the ID, ensure it is 24 character long and is correct (case sensitive)
QR Code's ID is incorrect	<a href="#">Contact software support</a>

### 3.2.3 Can't Operate Your Mailbox

Causes	Solutions
No internet connection	Ensure you're have a strong Wi-Fi or data connection
The locking mechanism is faulty	<a href="#">Contact hardware support</a>
You no longer have access to the mailbox	The owner may have removed you and your account needs to be refreshed. Log in and out and re-add the mailbox. <i>If you are the owner, contact software support</i>

### 3.2.4 Can't Edit Mailbox Settings

Causes	Solutions
No internet connection	Ensure you're have a strong Wi-Fi or data connection
You are not the owner	Only the owner can edit these settings - please ask the owner to make your changes

## 4 Extras

Click the buttons below!

[ONLINE USER GUIDE](#)[LEAFLET](#)[AD](#)