

# BUILD YOUR OWN R2-D2 ONLINE USER GUIDE

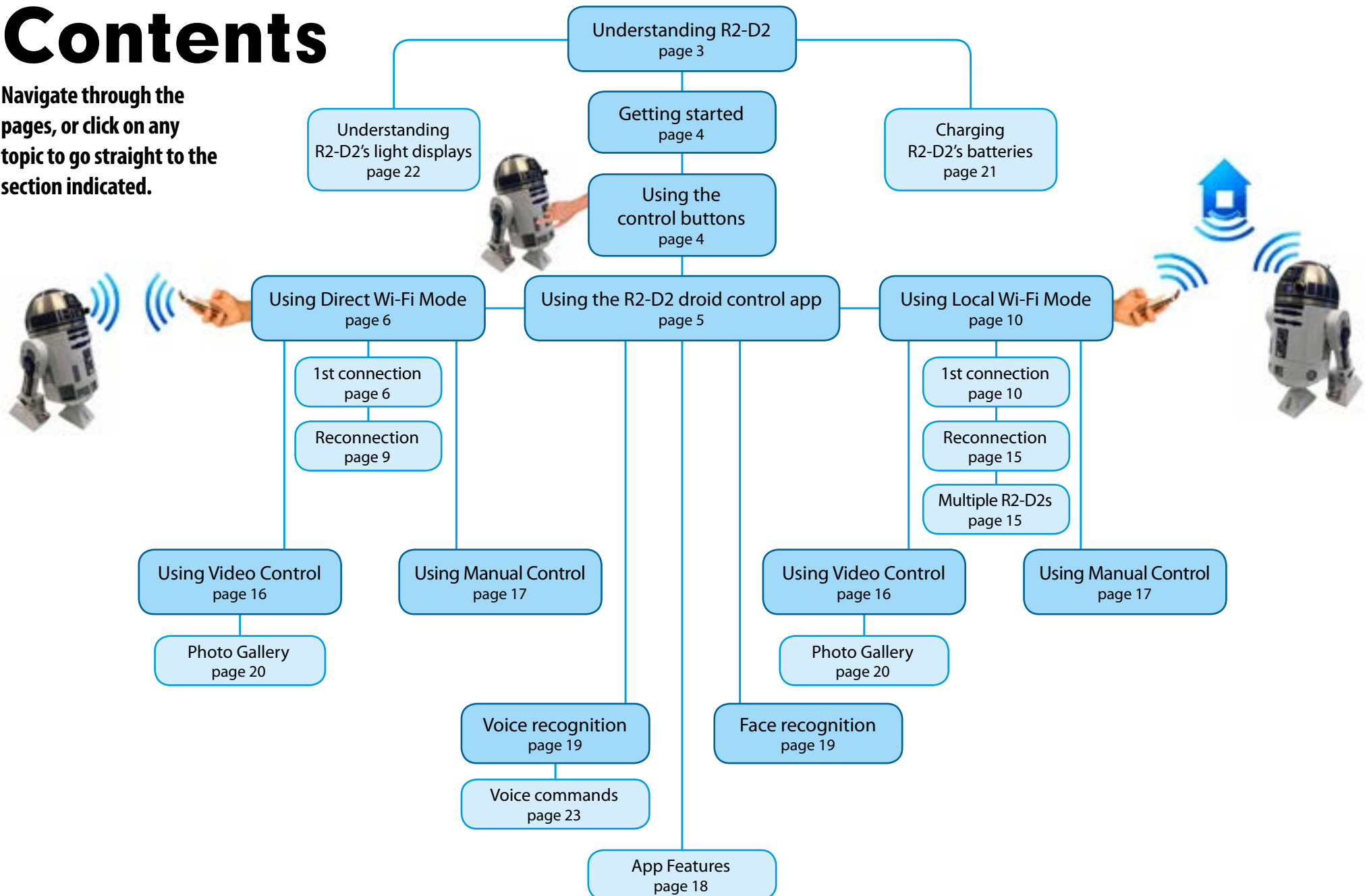


**Setting up  
and controlling  
DeAgostini's  
R2-D2 model**

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# Contents

Navigate through the pages, or click on any topic to go straight to the section indicated.



# Understanding R2-D2

These are the key features that control how R2-D2 works.

## Status displays

R2-D2 has two circular panels (one front and one rear) with LEDs that change colour and timing to show you what is going on inside R2-D2.

### Front status display

- Red
- Blue
- Purple

### Rear status display

- Green
- Yellow

## Microphone

This picks up sounds from around R2-D2, which includes your voice commands.

## LCD displays

Show optional light patterns.

## Shoulder sensors

The shoulder and front sensors detect walls and vertical obstacles at a distance of around 40cm when R2-D2 is in Patrol mode.

## Front sensors

## Control panel

These six buttons are used to activate different functions, including R2-D2's connection to your smartphone and the app running on it:

- Button 1:** Patrol
- Button 2:** Arm control
- Button 3:** Lightsaber control
- Button 4:** Pairing/Connection mode
- Button 5:** Switch mode
- Button 6:** Power on/off

## Camera

- This has three functions:
1. To watch what is going on around R2-D2 and beam it to your phone.
  2. To recognise human faces.
  3. To scan a QR code to connect to a local Wi-Fi network.

## Projector

This plays recorded 'holograms' stored in R2-D2's memory, in line with where the lens is pointing. For the clearest display, R2-D2 needs to be in a darkened area with a flat light-coloured surface at the optimum range to focus onto.

## Speaker

A speaker at the back allows R2-D2 to 'talk', and also sounds alerts during certain activities.

## Charging socket

Used to connect R2-D2 to his mains adaptor if his batteries need charging.

## Main power switch

Turns R2-D2's battery power on or off.

## Foot sensors

The bumper on R2-D2's middle foot detects any low-level contact. Sensors under his feet detect steps that might cause R2-D2 to fall.



# Getting started

## Start by powering up R2-D2.

- Install a set of prepared and fully charged batteries, and briefly plug in the battery charger as explained in Issue 100 (pages 12-13).
- R2-D2 now has the potential to start moving around, so place him safely on the floor!
- Turn R2-D2 to face you and reach underneath the right-hand side to find the main power switch.
- Flip the main power switch on (as shown on the right).
- R2-D2 is now ready to go, but nothing will appear to happen until you press the Power button 6, as explained below.



# Using the control buttons

With the power turned on, the six buttons on R2-D2's front panel are used to start him going, and to connect him to his app. You can also control several functions directly, just by pushing a button.



**Button 1** Patrol mode  
Status: On/Off



**Button 2** Arm control  
Status: Extended/Retracted



**Button 3** Lightsaber control  
Status: Up/Down



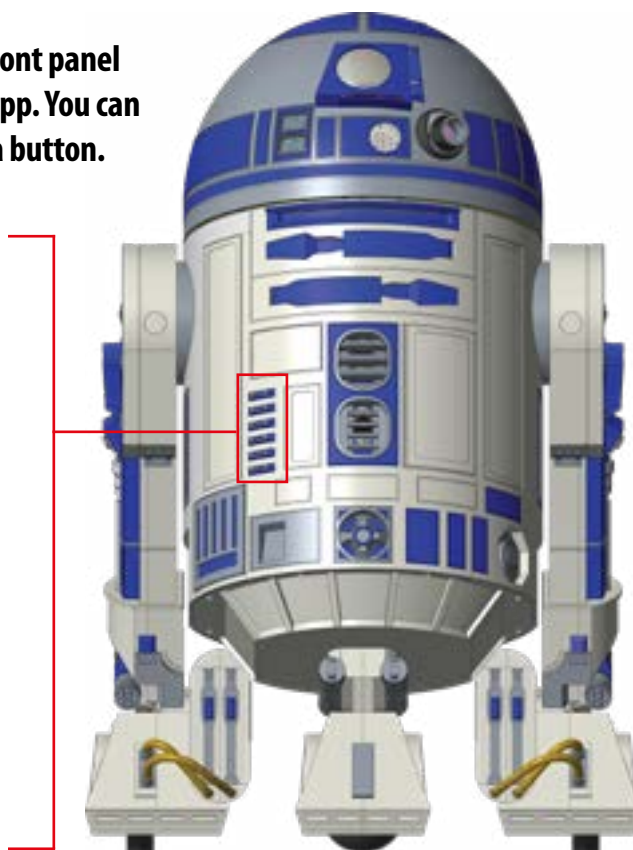
**Button 4** Pairing/Connection mode  
Use to connect to local Wi-Fi



**Button 5** Switch mode button  
Status: change between Direct and Local Wi-Fi connection



**Button 6** Power button  
Short Press: on/off  
Long Press: force shut down



To turn on your R2-D2, press the Power on/off button 6 briefly.

- The red light on R2-D2's front status display will come on and he will jerk forward.
- His head will rotate left and right, then centre.
- The front status display will turn purple and the rear status display will go green or yellow, then R2-D2 will make a noise to indicate his readiness.

R2-D2 is now active. You can use the top three control buttons right away to try out these functions:

- Turn Patrol mode on or off with button 1. R2-D2 will start to explore his surroundings, robotically avoiding obstacles\*.
- Make R2-D2's arms go in and out with button 2.
- Make the lightsaber go up and down with button 3.

\* In Patrol mode, R2-D2 will sense walls and vertical obstacles at a distance of around 40cm, and his infrared staircase sensor will also react if he starts running over a step. This is less effective on dark floors, and he may find it hard to reverse quickly on slippery surfaces. Watch out when you run R2-D2 for the first time in a new location, to make sure his sensors react in time.

# Using the R2-D2 droid control app

To control R2-D2's advanced operations you need to install his special app on a suitable Apple or Android device, then pair it with your droid.

The R2-D2 droid control app is available for Apple iPhone 5S or later running iOS 11 or higher, or Android smartphones or tablets running OS 4.4 KitKat or higher.

- Download the R2-D2 droid control app onto your device and open it.
- After it starts up, you will see a Home page like this, telling you at the top that the app is **NOT CONNECTED** to R2-D2.



- To get started, press the connection button (indicated by the finger above).
- This will bring up the Connection Page. The bars near the top allow you to choose to connect in Direct Wi-Fi Mode or Local Wi-Fi Mode.
- Start by connecting in Direct Wi-Fi Mode, which is already highlighted. Direct Wi-Fi will work anywhere where your smartphone is within range of R2-D2, independent of any other networks in the area.



# Connect in Direct Wi-Fi Mode

Here is how to connect R2-D2 to the app in Direct Wi-Fi Mode for the first time. After you have done this once, the app will remember the settings for R2-D2's router and you will be able to reconnect without entering passwords (see page 9).



- The first Connection Page tells you:  
**PRESS THE SWITCH CONNECTION MODE BUTTON (5) ON R2-D2 TO CHANGE WI-FI MODE. IF THE YELLOW LIGHT IS ON, YOUR R2-D2 IS IN DIRECT WI-FI MODE.**



- If the yellow light in the Rear Status Display is on, R2-D2 is already in Direct Wi-Fi mode and there is no need to change it.



- If the green light in the Rear Status Display is on, R2-D2 is in Local Wi-Fi mode and you will need to change it by pressing the Switch Connection Mode button 5 to bring up the yellow light.

- With R2-D2 in the right mode, swipe left to view the second Connection Page.

- The text changes to read:  
**PRESS THE WI-FI SETTINGS BUTTON BELOW TO ENTER THE WI-FI CONNECTION PAGE. CHOOSE THE R2-D2-ROUTER R2-D2-XXX [XXX MAY BE ANY NUMBER BETWEEN 100 AND 999] NETWORK AND ENTER THE PASSWORD "00000000".**



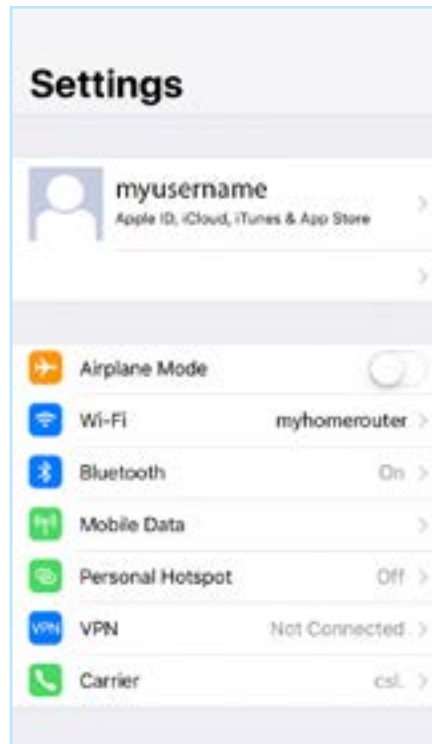


## Connect in Direct Wi-Fi Mode *continued*

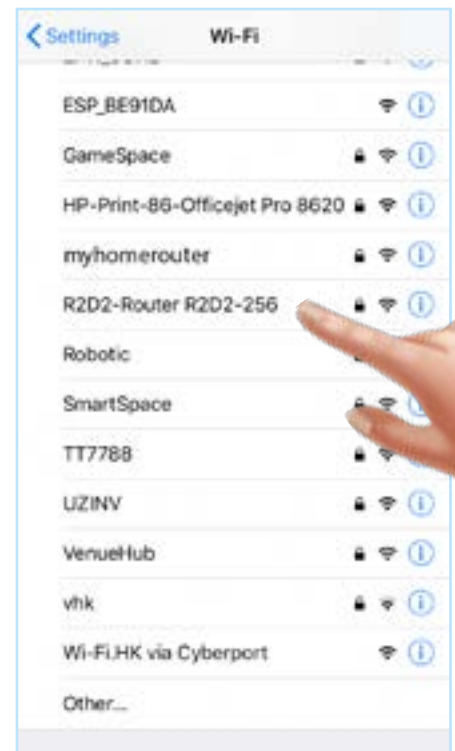
- Press Wi-Fi Settings to connect to R2-D2's internal Wi-Fi router.



- This will bring up your smartphone's normal Settings screen. This is a typical example, but what you see will vary between Android or Apple devices, and different versions of the operating system.



- Select Wi-Fi to bring up a list of Wi-Fi networks in range. These will vary depending on where you are, but you need to select the one that starts R2D2-Router...
- (Our example ends in 256, but the number at the end will vary from one droid to another.)



## Connect in Direct Wi-Fi Mode *continued*

- Enter the default password, which is 00000000



- Then press the Join button.

- Quit the Wi-Fi setting page, then go back to the droid control app to bring up the Connection Page again.



- Press the Connect button. The screen should change to show you have made a successful connection in Direct Wi-Fi mode.

## Successful connection

### RED LIGHT

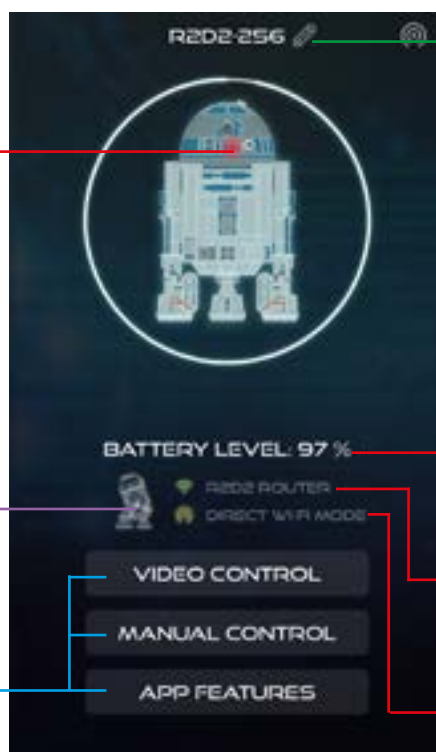
The red light on the main image of R2-D2 will be glowing to indicate that he is in Standby Mode.  
For a guide to the other status displays, go to page 22.

### R2-D2 ICON

Press the small image of R2-D2 to select the most frequently used optional settings (see page 18).

Press these buttons to choose between:

**Video Control** (see page 16)  
**Manual Control** (see page 17)  
**App Features** (see page 18)



### PENCIL ICON

The preset number of your R2-D2 should appear at the top of the screen. You can change this to display a name of your choice by tapping on the pencil symbol next to the number.

### BATTERY LEVEL

This line shows R2-D2's state of charge.

### ROUTER

This line shows that you are connected to R2-D2's internal router.

### WI-FI MODE

This line shows you are in Direct Wi-Fi Mode.



# Reconnect in Direct Wi-Fi Mode

When R2-D2 or the app is turned off, the Wi-Fi connection will be broken, but the settings are stored to make it easy to reconnect.

- Make sure your R2-D2 is in Direct Wi-Fi Mode, as indicated by the yellow light in the Rear Status Display. If it isn't, switch as explained on page 12.
- The app may be able to auto-connect to R2-D2, in which case it will bring up the Direct Wi-Fi connection screen as before.



- When your smartphone has locked or if the R2-D2 droid control app is in the background, R2-D2 and the app may not reconnect automatically.
- In this case, press the Connect button to start reconnecting manually.



- Then press the Connect button on the next screen to reconnect.

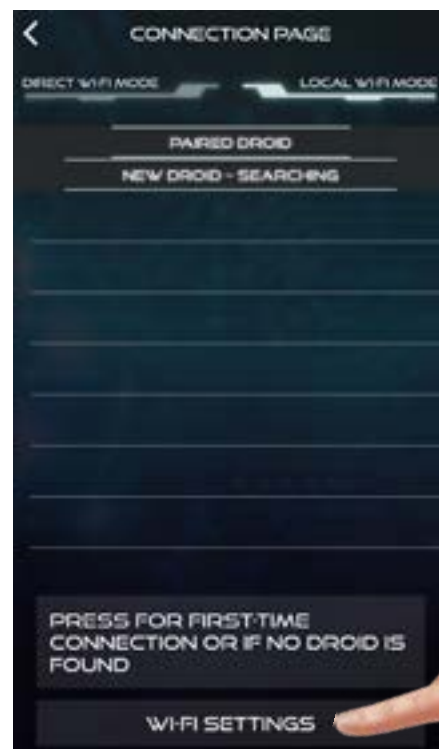
# Connect in Local Wi-Fi Mode

Use this method to connect both your device and R2-D2 to a given broadband network for the first time. After you have done this once, R2-D2 and the app will remember the settings and you will be able to reconnect without entering passwords (see page 15).

- Start from the Home Page that is showing you are **NOT CONNECTED**, press the connection button in the right top corner.




- The Connection Page comes up with Direct Wi-Fi Mode highlighted, so press on Local Wi-Fi Mode to change it.

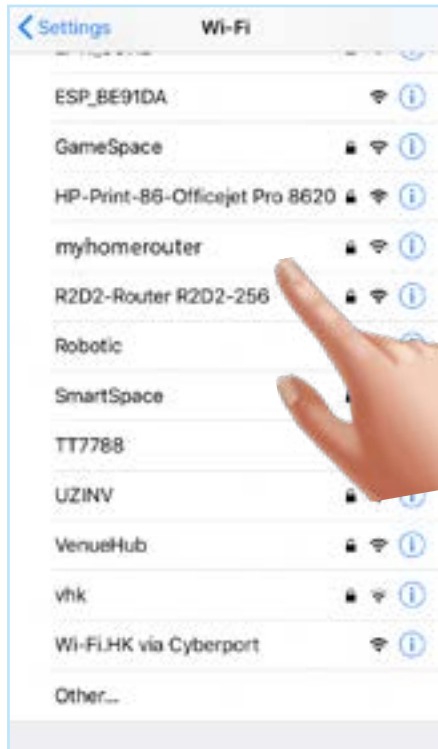



- As Local Wi-Fi has not been connected before, you will see this screen, with a message saying **NEW DROID - SEARCHING**
- Press the Wi-Fi Settings button

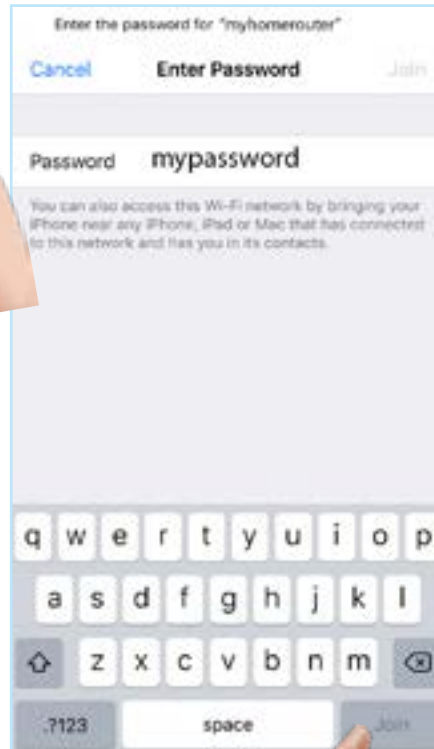
**IMPORTANT NOTE**  
R2-D2 operates on a 2.4 GHz (gigahertz) network. If you have a dual band router, this will offer an alternative 5GHz band, so you will need to ensure that you are using the right settings. If you are not sure how to do this, contact the technical support for your router or broadband provider.


## Connect in Local Wi-Fi Mode *continued*


 This will bring up the Wi-Fi Settings for your smartphone. This screen shows a typical example, but it will vary between Android or Apple devices, and with different versions of the operating system.




 Select your local Wi-Fi network. In this example, it is called **myhomerouter**.




 Enter **your** local Wi-Fi password where we put mypassword. Then press the Join button.


 Quit the Wi-Fi Settings page, then go back to the R2-D2 droid control app Connection Page



 Press the button that says **PRESS FOR FIRST-TIME CONNECTION OR IF NO DROID IS FOUND**.



 This will bring up the Pairing Tutorial page.

 The text reads:  
**PRESS THE SWITCH CONNECTION MODE BUTTON (5) ON R2-D2 FOR 2 SECONDS TO CHANGE WI-FI MODE. IF THE GREEN LIGHT IS ON, YOUR R2-D2 IS IN LOCAL WI-FI MODE.**



## Connect in Local Wi-Fi Mode *continued*

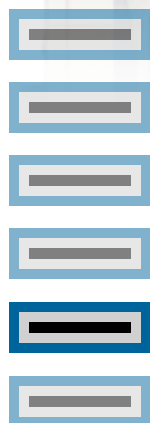
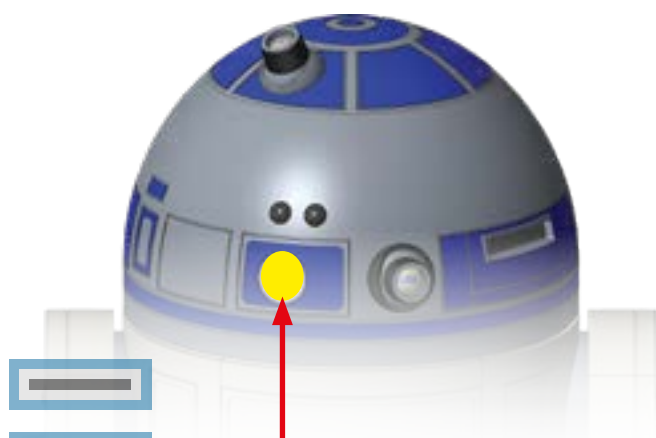
- If the green light in the rear status display is on, R2-D2 is in Local Wi-Fi mode and there is no need to change it.



- When the green light is on, swipe left to view the second Pairing Tutorial page. The text changes to read:  
**PRESS THE PAIR MODE BUTTON (4) ON R2-D2 TO CONNECT WI-FI. THE BLUE LIGHT SHOULD FLASH QUICKLY FOR 30 SECONDS. NOW YOU CAN PRESS THE SKIP THIS TUTORIAL BUTTON BELOW TO GENERATE LOCAL WI-FI QR CODE FOR R2-D2.**

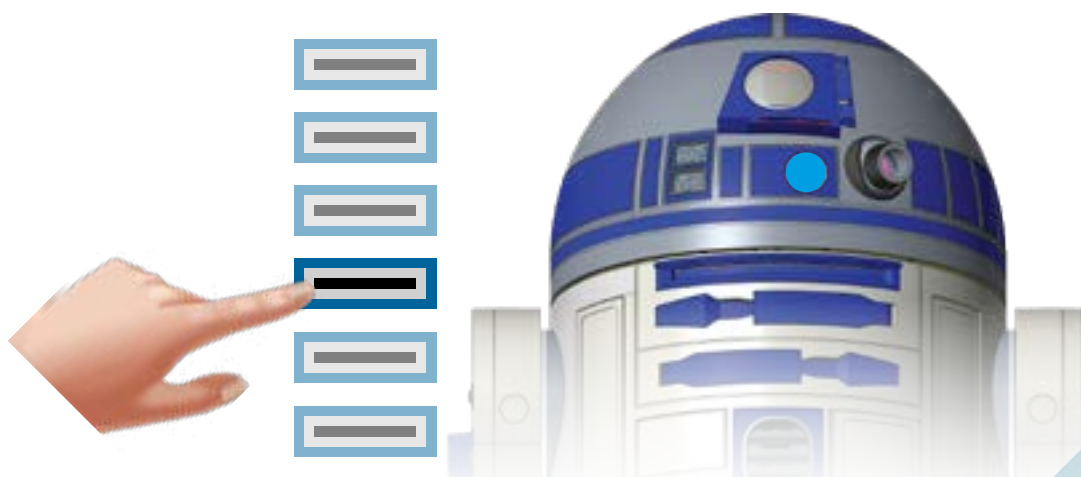


- If the yellow light in the rear status display is on, R2-D2 is in Direct Wi-Fi mode and you will need to switch mode.



- Press the Switch Mode button 5 to change from Direct Wi-Fi Mode to Local Wi-Fi Mode. The light colour in rear status display (red arrow) will change from yellow to green.

- Press the Pairing/Connection button 4. The blue light in R2-D2's Front Status Display should start to flash quickly. This indicates that R2-D2 is waiting to scan a QR code, which you will see how to generate on the next page.



## Connect in Local Wi-Fi Mode *continued*



- Press the Skip Tutorial button to go to the next stage.



The name of your local Wi-Fi network should appear on this line (My Home Wi-Fi in this example).

Enter **your** local Wi-Fi network password here  
Then press the Join button

- This will generate a unique QR code with the details of your Wi-Fi connection, which is displayed in the square at the top of the screen.



- Below it is the instruction: **LET YOUR R2-D2 SCAN THE QR CODE ABOVE WHEN THE QUICK FLASHING BLUE LIGHT IS ON.**
- Make sure the blue light is flashing (as explained on page 12) and show the QR code to R2-D2's camera as indicated on the screen. He will find it easier to scan if the lighting in the room is not too bright, as he adjusts the sensitivity of his camera to suit the environment.



## Connect in Local Wi-Fi Mode *continued*

- If R2-D2 reads the QR code successfully, the screen should change to show you have made a successful connection in Local Wi-Fi mode.

### PENCIL ICON

The preset number of your R2-D2 should appear at the top of the screen. You can change this to display a name of your choice by tapping on the pencil symbol next to the number.

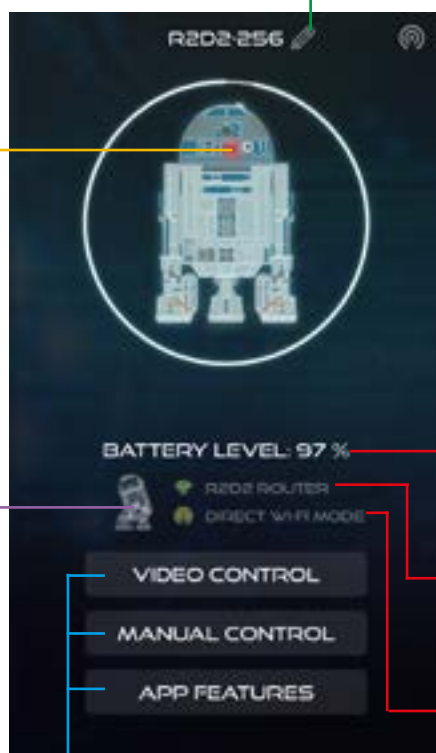
### RED LIGHT

The red light on the main image of R2-D2 will be glowing to indicate that he is in Standby Mode.

For a guide to the other status displays, go to page 22.

### R2-D2 ICON

Press the small image of R2-D2 to select the most frequently used optional Settings (see page 18).



### BATTERY LEVEL

This line displays R2-D2's battery level.

### WI-FI CONNECTION

This line displays the name of the Wi-Fi network

### WI-FI MODE

This line shows you are in Local Wi-Fi Mode.

Press these buttons to choose between:

- Video Control** (see page 16)
- Manual Control** (see page 17)
- App Features** (see page 18)

## Troubleshooting

If R2-D2's Front Status Display changes to a red light, it means that he cannot connect to the Wi-Fi or that the QR code is invalid.

Go back and check that the password you entered for Your local Wi-Fi network is correct and that you entered it manually. (You may have to disconnect from your Wi-Fi then log on again to do this.)

Remember that R2-D2 can only log on to a 2.4GHz network, so if you have a dual band router, check and make sure that you have not tried to connect to a 5GHz network. You may find you need to change the settings on the router.

To try again, press the Pairing/Connection button to make R2-D2's Front Status Display flash blue to indicate that R2-D2 is waiting to scan the QR code.

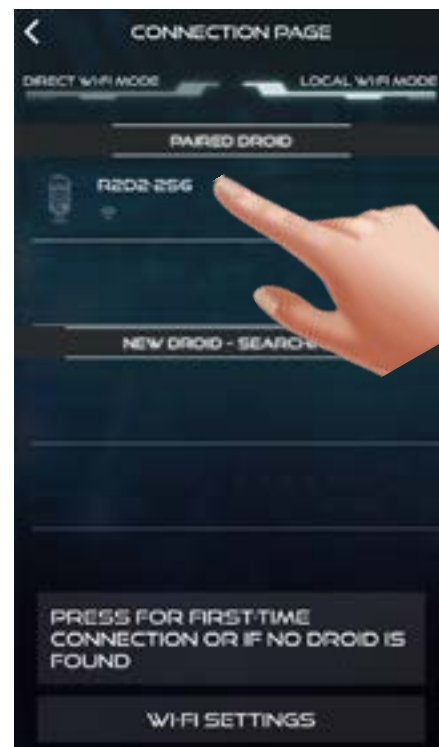


# Reconnect in Local Wi-Fi Mode

When R2-D2 or the app is turned off, the Wi-Fi connection will be broken, but so long as you are in the same Wi-Fi network, the settings are stored to make it easy to reconnect.



- ⚙️ Make sure R2-D2 is in Local Wi-Fi Mode (displaying the green light in the Rear Status Display).
- ⚙️ Navigate to the Local Wi-Fi Mode Connection Page on the app.
- ⚙️ The name of your R2-D2 will appear under Paired Droid. Press it to reconnect.
- ⚙️ The screen should change to show you have made a successful connection in Local Wi-Fi mode, with R2-D2's number at the top of the screen and the other status reports as before.



# Pairing more than one R2-D2 in Local Wi-Fi Mode

It is possible to connect more than one R2-D2 (such as one belonging to a friend) on the same network, although each smartphone only connects to one R2-D2 at a time.

- ⚙️ Set up the new R2-D2 ready for pairing in the same way as the first one (see page 12).
- ⚙️ The second droid should have a different preset number (although there is a one-in-a-thousand chance of it being the same).
- ⚙️ After going through the pairing procedure, the Connection Page will show the name of the second droid under the New Droid section on the screen. You will need to press the Pairing/Connection button on the second R2-D2 and then select it in the app in order to pair with it.
- ⚙️ Once the second droid is connected via the app, you then have full control of it in the same way as you would for your own R2-D2. When you shut down R2-D2 or the app, the connection will be broken in the usual way.
- ⚙️ The next time you go to connect to R2-D2, you will have the choice of selecting either droid, so long as it is in the same Wi-Fi network and is in Local Wi-Fi Pairing mode (with the green light on).
- ⚙️ The next time you go to the Local Wi-Fi Mode Connection Page, you will see the names of both droids listed as shown on the right.



# Using Video Control

**Video Control works the same way in both Direct Wi-Fi Mode and Local Wi-Fi Mode.**

With the Home Page showing that you are connected to R2-D2 in Direct Wi-Fi Mode or Local Wi-Fi mode (as shown here), press the Video Control button.

The Video Control screen appears, overlaid on the view from R2-D2's camera.

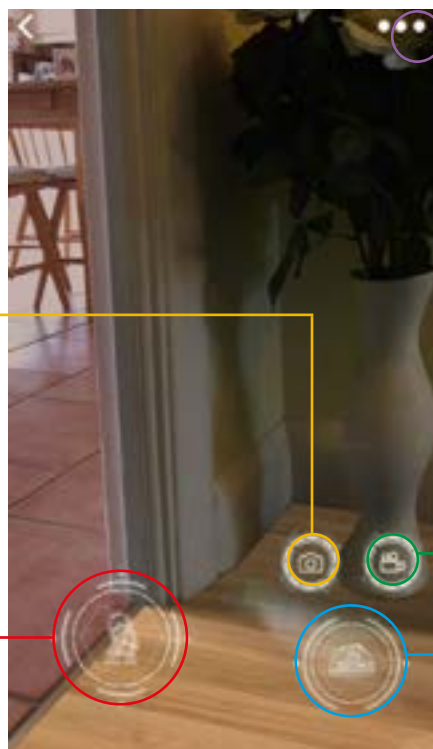


## STILL PHOTO BUTTON

Save an image in the app's Gallery (see page 20)

## DIRECTIONAL CONTROL

Move forward/  
Move backward/  
Turn left/ Turn right



## TOGGLE DISPLAY

Turn the controls overlaid on the image on and off

## VIDEO RECORDING BUTTON

Save a video clip in the app's Album

## HEAD ROTATION CONTROL

Turn R2-D2's head to the left/ Turn R2-D2's head to the right

**Toggle the display using the three dots at top right to see this screen.**



## SCROLLABLE ROUTINES

TURN LEFT  
TURN RIGHT  
TURN AROUND  
GO FORWARD  
SHAKE HEAD  
WALK IN A CIRCLE  
LIGHTSABER

Status: Up/Down

HOLOGRAM

Status: Play Hologram 1  
Play Hologram 2

TALK

Playing selected audio clips

ARMS

Status: Extended/Retracted

SHORT LCD

Status: On/Off

LONG LCD

Status: On/Off

PATROL

Status: On/Off

## Please note

In **Patrol** mode, R2-D2 will sense walls and vertical obstacles at a distance of around 40cm. His infrared staircase sensor will also react when he starts running over an edge but is less effective on dark floors. He may also find it hard to reverse quickly on slippery surfaces. Whenever you run R2-D2 for the first time in a new location, make sure his sensors will react in time.

When you control him manually, his sensors are switched off to make it easier to carry out tight manoeuvres, so avoid driving him into walls or over a drop where he might fall and suffer damage.

# Using Manual Control

Manual Control works the same way in both Direct Wi-Fi Mode and Local Wi-Fi Mode.

With the Home Page showing that you are connected to R2-D2 in Direct Wi-Fi Mode or Local Wi-Fi mode (as shown here), press the Manual Control button.



This brings up the Manual Control panel.

## HEAD ROTATION CONTROL

Turn R2-D2's head to the left/ Turn R2-D2's head to the right

## R2-D2 STATUS (page 18)

### STANDBY MODE

### LIGHTSABER STATUS

Status: Up/Down

### HOLOGRAM

Status: Play Hologram 1

Play Hologram 2

### SHORT LCD DISPLAY

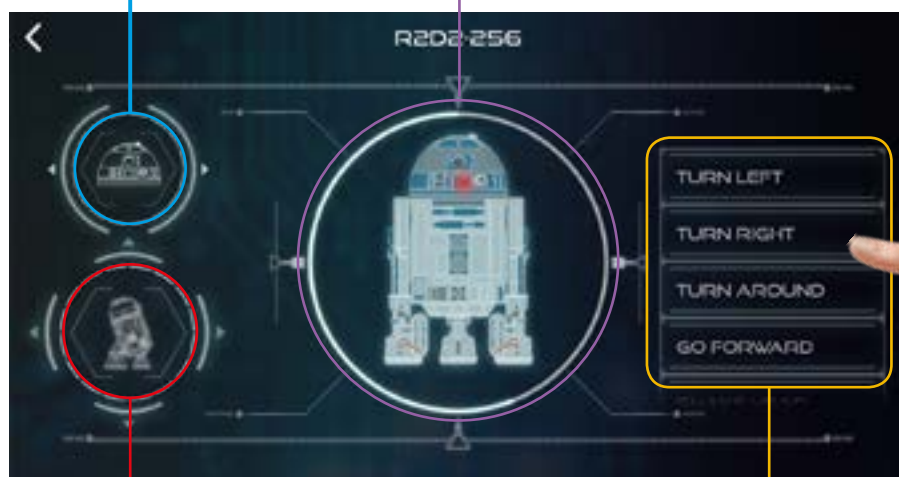
Status: On/Off

### PATROL MODE

Status: On/Off

### ARMS

Status: Extended/ Off



## DIRECTIONAL CONTROL

Move forward/ Move backward/ Turn left/ Turn right

## SCROLLABLE ROUTINES

### TURN LEFT

### TURN RIGHT

### TURN AROUND

### GO FORWARD

### SHAKE HEAD

### WALK IN A CIRCLE

### DANCE

### LIGHTSABER

Status: Up/Down

### HOLOGRAM

Status: Play Hologram 1

Play Hologram 2

### TALK

Playing selected audio clips

### ARMS

Status: Extended/Retracted

### SHORT LCD

Status: On/Off

### LONG LCD

Status: On/Off

### PATROL

Status: On/Off

## Please note

In **Patrol** mode, R2-D2 will sense walls and vertical obstacles at a distance of around 40cm. His infrared staircase sensor will also react when he starts running over an edge but is less effective on dark floors. He may also find it hard to reverse quickly on slippery surfaces. Whenever you run R2-D2 for the first time in a new location, make sure his sensors will react in time.

When you control him manually, his sensors are switched off to make it easier to carry out tight manoeuvres, so avoid driving him into walls or over a drop where he might fall and suffer damage.



# App Features and settings

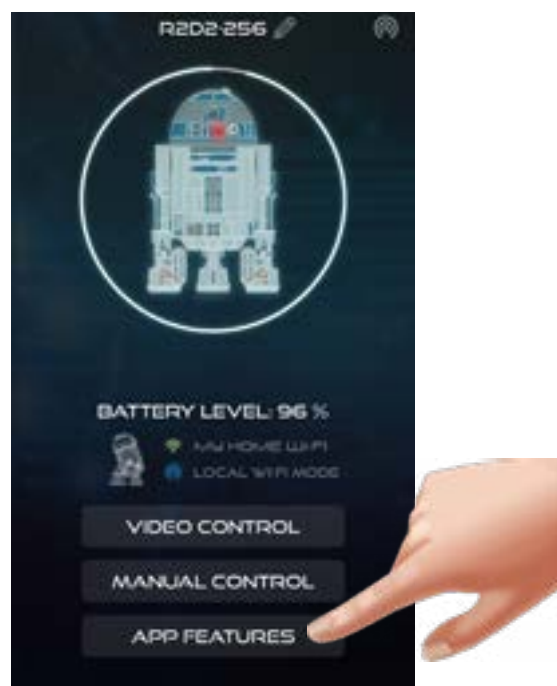
There are two ways to access R2-D2's settings and control some of his special features.

Press the small graphic R2-D2 button on the Home Page.

This brings up shortcuts to the most frequently used Settings.

Press the App Features button on the Home Page.

This brings up the main App Features page, which includes another route to the Settings.



## POWER OFF BUTTON

Shut down R2-D2

## MUTE BUTTON

Mute R2-D2's speaker



## VOICE RECOGNITION BUTTON

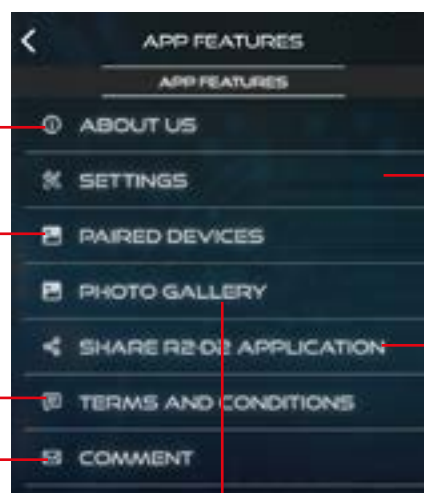
Switch voice recognition on or off.

## FACE DETECTION BUTTON

Switch face detection on or off.

These buttons have more information about the app.

This brings up the Settings buttons shown on the left.



This brings up a list of connections you have made.

This brings up a gallery of stored photos.

This allows you to copy the app to a friend or another device.

# Using Face Recognition

- When Face Recognition is turned on, R2-D2 is able to pick out your face and respond to it. Once your face is detected, R2-D2 will make a noise and his front status display will turn blue and stay on. If you move your face slowly within his field of vision, R2-D2 will turn his head to track you.
- If R2-D2 has difficulty seeing you, remember that he can only see you within his field of vision, which is quite narrow.
- You can experiment by turning on Video Control to make sure your face is within the field of vision and watching the screen to see what happens as you move around. If you wear glasses, it may help to take them off, and you should be aware that the background brightness will affect R2-D2's ability to pick you out from your surroundings.



# Using Voice Recognition

- Whenever Voice Recognition is turned on, R2-D2 will respond to a series of voice commands, once he hears the trigger word ('Hey R2-D2', or 'Good morning') to activate this function.
- Once R2-D2 recognises the trigger word, he will make his 'happy three chirp' sound and turn his head about 15° left and right. Then the rear status display will flash yellow and green, to indicate that R2-D2 is listening for the next command.
- If he recognises the next command, he will make his 'happy confirmation' sound and carry out the action requested, by going forward, turning left or whatever. See page 23 for a complete list of voice commands that he can recognise.
- If R2-D2 doesn't recognise a command within 30 seconds, he will stop listening for a command (indicated by the rear status display stopping flashing green and yellow). You will need to repeat a trigger word to set him listening again.
- If R2-D2 has difficulty hearing you, trying changing the volume or speed of the command, or try speaking from a different distance. Remember that the microphone is on top of his head. He should react to a normal volume and speed as if you are speaking to someone sitting right next to you, at a distance of half a metre or so. Another factor that may affect his ability to understand you is a high level of background noise.



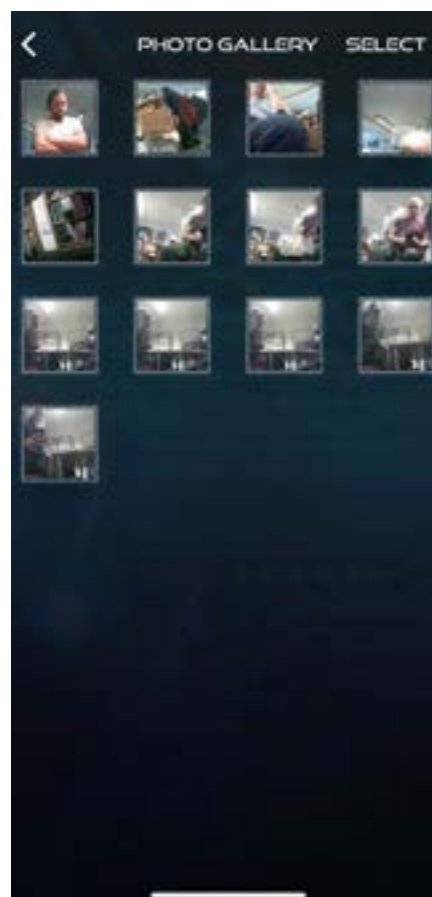
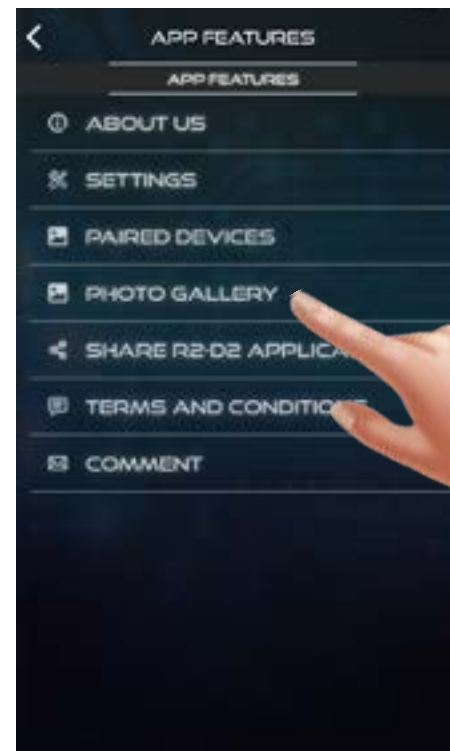
# Photo Gallery

**Pictures and video clips captured by R2-D2's camera are stored within the Photo Gallery section of the app.**

Click the App Features button on the Home page to go to the App Features page, as explained on page 18.

Select the Photo Gallery option. This brings up a display showing thumbnails of the stored images.

Select any image to bring it up full screen. The buttons at the bottom allow you to save the image to your smartphone's main photo library or consign it to the trash.





# Charging R2-D2's batteries

After an extended period of use, R2-D2's batteries will need charging using the mains adaptor. See also page 23 for information about the effect of ageing and storage on the batteries.



- The app displays R2-D2's battery level continually, either graphically, or as a number.



- When the level drops below 20%, his front status display turns red. You should not fully deplete the batteries or store R2-D2 in a state of total discharge if he is to be dormant for any length of time, as this may stop the batteries reaching full recharge capacity.



- You can charge R2-D2 whether his power switch is turned on or off. If he is powered up, his front status display will change colour to show the progress of his charging as shown below, but make sure he is not able to move around.



- Turn R2-D2 to access the power socket just ahead of his middle leg.
- Plug the mains adaptor into the hole and leave it until he is fully charged.



- If R2-D2 is powered up while he is being charged, the front status display will slowly flash purple.



- When he is fully charged, his front status display will turn blue.

# Reference charts

## Understanding R2-D2's light displays

R2-D2's front and rear status displays light up in different colours to display as his activity or status changes.

Display	Colour	Pattern & Duration	Scenario
Front	Red	On	Starting up (stage 1)
	Purple	Fast flash	Starting up (stage 2)
	Purple	On	Starting up (stage 3)
Front	Red	On	Battery level less than 20%
Front	Purple	Slow flash	R2-D2 is charging
Front	Blue	On	R2-D2 is charged
Front	Red	Slow flash: 30 sec	Pairing Mode
Front	Blue	Fast flash: 2 sec	Scanning QR code and connected Local Wi-Fi mode
Front	Red	Slow flash	Fail to connect in Local Wi-Fi mode
Front	Red	Slow flash: 15 sec	Patrol Mode
Front	Red	Fast flash	Powering Off
Front	Blue	On: 1.5 sec (timeout)	Face Detected
Rear	Green	Slow flash: 1.5 sec	Voice Recognition Mode
Rear	Yellow	Slow flash	Sleep Mode (Direct Wi-Fi Mode)
Rear	Green	Slow flash	Sleep Mode (Local Wi-Fi Mode)
Rear	Yellow	On	Direct Wi-Fi Mode
Rear	Yellow	Fast flash	Switching to Direct Wi-Fi Mode
Rear	Green	On	Local Wi-Fi Mode
Rear	Green	Fast flash	In Local Wi-Fi Mode but no router connected

## Understanding R2-D2's status displays

The graphic of R2-D2 in the circle on the Home Page or Manual Control Page lights up different areas to display what activity is in progress.



STANDBY MODE

The illuminated part of the outer circle changes length to show the level of the battery. A full circle equals 100% charged.



LIGHTSABER Status: Up



HOLOGRAM Status: Projecting



MECHANICAL ARMS Status: Out



SHORT LCD DISPLAY Status: On



PATROL MODE Status: On

## R2-D2's voice commands

This is a list of words that R2-D2 recognises when Voice Recognition is turned on (see page 19).

<b>TRIGGER WORDS</b>	Hey R2-D2 Good morning
<b>TURN LEFT</b>	Turn left Left turn Rotate left
<b>TURN RIGHT</b>	Turn right Right turn Rotate right
<b>MOVE STRAIGHT AHEAD</b>	Go forward Go straight Go ahead
<b>SHAKE HEAD</b>	Shake your head Say no Negative
<b>WALK A CIRCLE</b>	Walk a circle Give me a circle Round Round Round
<b>DANCE</b>	Dance please Dancing Dancing Go dance
<b>EJECT AND RETRACT THE LIGHTSABER</b>	Lightsaber Lightsaber action
<b>OPEN OR CLOSE FRONT ARMS</b>	Move arms Arms Spacecraft linkage
<b>EXPLORE/PATROL MODE</b>	Patrol Go patrol Check around

**Don't forget that R2-D2 is a wilful droid with a mind of his own. He may sometimes choose to ignore you or react to a command in his own way!**

## Battery ageing and storage

Lithium-ion batteries gradually degrade in normal use. This results in their capacity being reduced, until they eventually become unusable and have to be replaced. The number of theoretical recharge cycles they can provide is affected by how much they are discharged. For example, a cell taken to 100 per cent depth of discharge (DoD) should last for 300-500 cycles, but a cell taken to only 50 per cent DoD will be able to provide 1200-1500 cycles.

Cell ageing is also increased by use at high temperatures, and being stored in a high state of charge. If you are leaving R2-D2 dormant for a long period, maintain the batteries in a partially charged state. Never leave the batteries in a fully discharged state or allow them to self-discharge fully, as this will degrade them.

Always read any safety notes provided with new cells, and store them in insulating containers (often supplied on purchase) until they are installed in R2-D2's battery box. Lithium-ion batteries should never be crushed, exposed to flames or excessive heat. They can be damaged if dropped, and may leak or suffer from 'thermal runaway' if damage creates an internal short circuit. Never use damaged cells, but dispose of them or any old batteries at a recycling centre.



# Custom finishing

When completed, R2-D2 has a factory-fresh finish, but you may prefer him to have a 'well-used' appearance, as seen in most of the movies. The example shown here has been finished with a special weathering paints after assembly and testing. The weathering kit shown is available through the website, along with hints and tips on how to use it.



Weathering kit, available through the website.

