Connected TV Applications for TiVo

Program Your Remote

Design Outline

14 Aug 2017

Changelog

14 Aug 2017 (changes after review of 3 Aug document)

- Copy was updated to reflect requests from Brand.

- The number of codes presented to the user for the auto-detect method has been limited to 5. A number of solutions were discussed for creating an initial short list for the user (we do not overwhelm the user straight away with, say, 50 codes to try), and it was agreed the simpliest solution was to make the maximum of the initial set configurable in the app and that this can be tweaked manually after we get feedback from the trialists (we might increase the maximum if many of the trialists fail with the auto-detect method).

- Flow was adjusted based on Terry Featherstone's description of the the Solution Design.

3 Aug 2017 (changes after review of 28 Jul document)

- Upon further research it was found that the instructions for pairing an AV receivers are very different from TVs (eg. the activation keys on the remote differ depending on device). The flows and screens have been adjusted to accommodate this.

- Jason Bridge felt we should add copy to assure users the process will "only take a few minutes," so this has been added.

- Sarah Sparks has noted that a full test of the VOLUME, MUTE and POWER buttons are needed for TVs because pairing one button doesn't guarentee the pairing of all three. An additional screen was added to prompt the user to test this.

- Jason wondered if some users might forget to put their remotes into program mode every time before entering a code. To prevent this an error trap has been added and a warning is displayed.

- on-screen keyboard added for text entry.

- A final message screen has been added, a sort of apology, in the event that the user is unable to pair their remote at all.
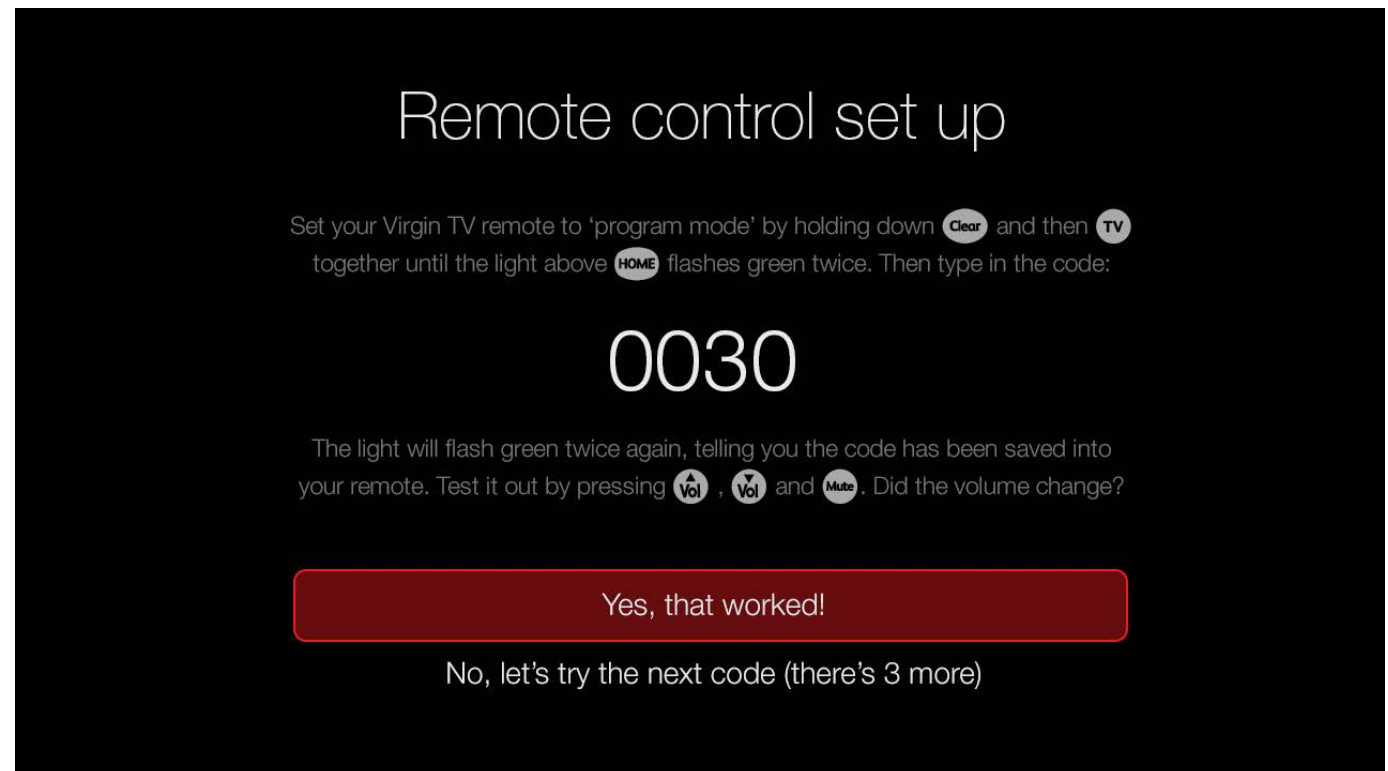
Overview

Purpose

This app helps customers program their Virgin TV remote control so that the VOLUME, MUTE, and POWER buttons pilot their TV (or AV receiver).

Background

Televisions are made to 'listen' only for the patterns of infra-red pulses which match the remote control sold with it. These sets of IR pulses are referenced by a 4-digit remote control code. A universal remote, like the Virgin TV remote, can be programed using these 4-digit codes to send out different sets of IR pulses to pilot many devices. This app helps with the pairing by finding a customer's TV remote control code so that the customer can enter it into their Virgin TV remote.

Launch Points

This app launches during TiVo software installation (a.k.a. Quickstart) and from the Help App.

Remote control set up

Set your Virgin TV remote to 'program mode' by holding down **Clear** and then **TV** together until the light above **HOME** flashes green twice. Then type in the code:

0030

The light will flash green twice again, telling you the code has been saved into your remote. Test it out by pressing **Vol**, **Vol** and **Mute**. Did the volume change?

Yes, that worked!

No, let's try the next code (there's 3 more)

Screen instructing the user how to program their remote with a 4-digit code that the app guesses matches their TV.

How it Works

The Main Journey

The user is guided through 3 remote control code look-up methods, from the quickest to the most time consuming:

Method a) Auto Detect
Method b) Manual Search
Method c) Scan Search

If the user gives feedback that a look-up method is successful the app will quit, but if a look-up method is unsuccessful the app guides the user to the next one. Each method, then, acts as a fallback for the previous one. Each method follows 3 main steps:

Step 1) Look-up Remote Control Codes
Step 2) User Programs Remote Control
Step 3) User Gives Feedback

After trying a look-up method the customer is prompted to test the pairing while pressing the VOLUME, MUTE, and POWER buttons.

Other Functions

The user advances from screen to screen by pressing the ARROW and OK buttons. The user can step back to previous screens in the flow by using the LEFT, SKIP BACK or BACK buttons.

When using manual search the NUMBER buttons are used to type and REWIND is used to backspace.
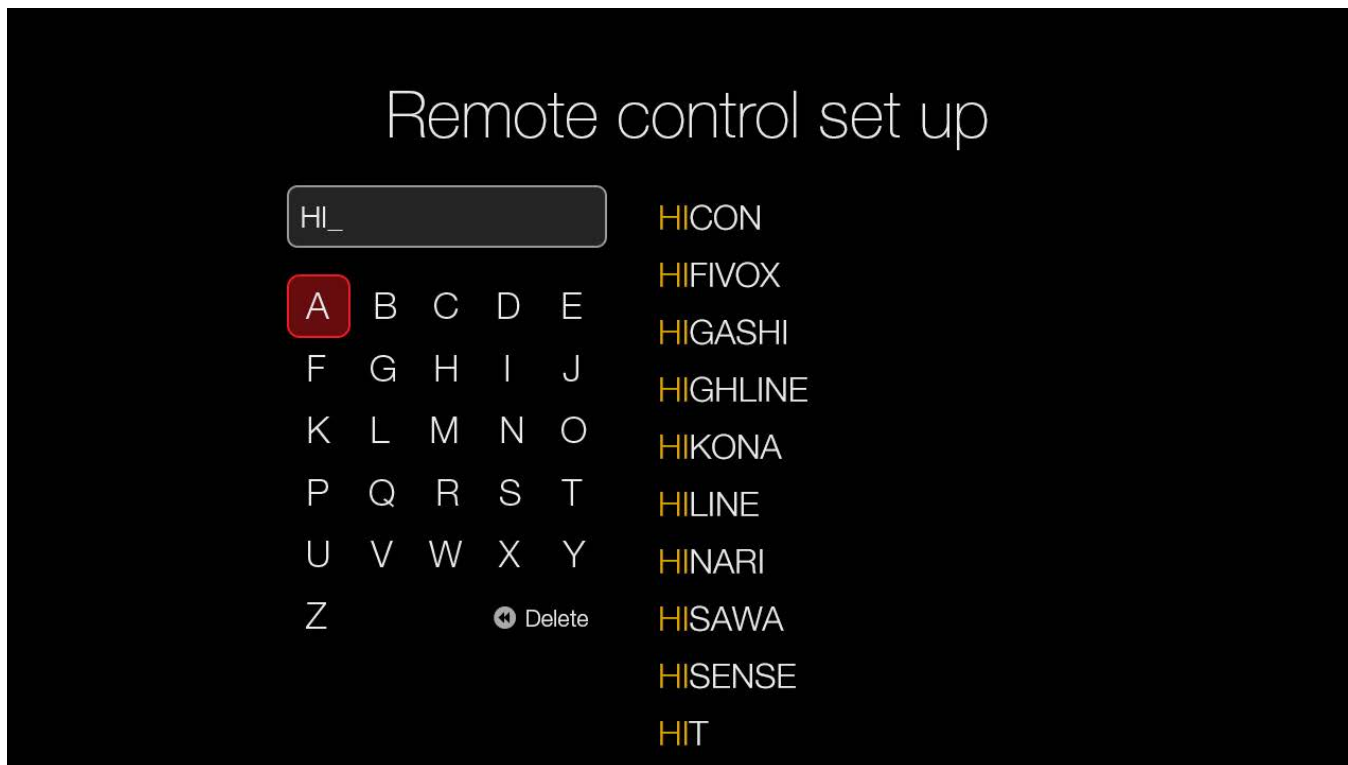
This app also includes the 'Version Viewer' module so that the user can see the version number and other developer notes (see 'VersionViewer.pdf' in jcb-wb-p1:3080/jira/browse/TVAPPS-1109)

A Better Customer Experience through Machine Learning

By taking feedback from users the app will learn which codes have worked in the the past against the detected EDID information, which codes are most likely to work, and even if many customers are failing to program their remotes altogether. Over time the app will collect enough information to which code is right for the user's TV, or at least make a good guess about which codes should be displayed first.

Flowchart

Launch → prompt user to start app

• Set up my remote now
• No thanks, maybe later

1) Look-Up Method
- a) Auto Detect
- b) Manual Search (TV)
- c) Scan Search (TV)
- b) Manual Search (AV receiver)
- c) Scan Search (AV receiver)

prompt user for device type
• a television?
• an AV receiver?

app attempts to filter list of RC codes based on selection

a) Auto Detect
"Checking..." — app attempts to retrieve EDID from device via HDMI cable
Make retrieved? — N
app sends Manufacturer ID to online database and attempts to retrieve matching RC code(s)
Code(s) for Make retrieved? — N
AV receiver? — Y / N (TV is assumed)
additional info (model, year)? — N / Y
server returns RC codes 'as is' without resorting / server returns a resorted list of RC codes(s), with most-likely-to-work first
server returns RC codes for AV receivers only

b) Manual Search (TV)
prompt user for popular manufacturer name
• (TV Make name(s))
• None of the above
prompt user to type manufacturer name
User types: {string}
app suggests TV Make names containing the input string as the user types it
display TV Make name(s)
• (TV Make name(s))
• None of the above
forward array of *all* RC codes for that Manufacturer, with most popular code(s) first

c) Scan Search (TV)
Introduce TV code scan search
• Got it, tell me how
• No thanks
Instruct how to perform scan search

b) Manual Search (AV receiver)
prompt user for popular manufacturer name
• (AV Make name(s))
• None of the above
prompt user to type manufacturer name
User types: {string}
app suggests AV Receiver Make names containing the input string as the user types it
display AV Make name(s)
• (AV Make name(s))
• None of the above
forward array of *all* RC codes for that Manufacturer, with most popular code(s) first

c) Scan Search (AV receiver)
Introduce AV code scan search (w. audio)
• Got it, tell me how
• No thanks
how to perform scan search (w. audio)

2) User Programs RC
display RC code & AV instructions / display RC code & TV instructions
user puts RC into program mode, enters RC code into RC and tests success with volume buttons
Error! — OK
number button detected? — Y / N
more RC codes (5 max*)? — N / Y (*configurable maximum)
more RC codes in array? — N / Y
user puts RC into program mode, sets to scan (0999), and sends out codes from RC, waits for TV to switch off & on, and tests success with volume buttons
user puts RC into program mode, sets to scan (1999), and sends out codes from RC, waits for AV receiver to mute, and tests success with volume buttons

3) User Feedback
• Yes, it worked
• No, try the next one
• Yes, it worked
• No, it didn't work

prompt user to test TV power control
• Yes, I can turn on
• No, it didn't work
• I'm done, continue
• Go back, try again

Sorry

store quit / store result / store failure / store successful result

Quit

More About Remote Control Code Look-Up Methods

The Manual Search has an on-screen keyboard for text entry and a scrollable column of results.

Auto Detect

If the customer has connected their set top box with a HDMI cable their device specifications can be sent via the cable to a computer server which will try to return the matching 4-digit remote control code to the app. The user can then put their remote control into program mode and enter the RC code into their remote. The user can then test for sucess.

Manual Search

If Auto Detect fails the next method is to manually look up their RC code. The user types in the brand name of their device and the app returns their manufacturer's 4 digit remote control codes. The user can then enter the codes into their remote and test which one works.

Scan Search

If the other methods fail the user can opt for Scan Search, a way of automatically scanning through a large database of RC codes stored in the remote. After switching their remote control into program mode the user enters a 'ready to scan' code ['0999' or '1999']. By tapping on the CHANNEL UP button once every two seconds hundreds of codes can be tested one by one. If the devices switches off or mutes the user will have found the correct code. CHANNEL UP is released to stop the scan. If the Virgin TV remote VOLUME buttons control the device the RC code is correct.

Example User Journey 1: Best case scenario with Auto Detect on a TV
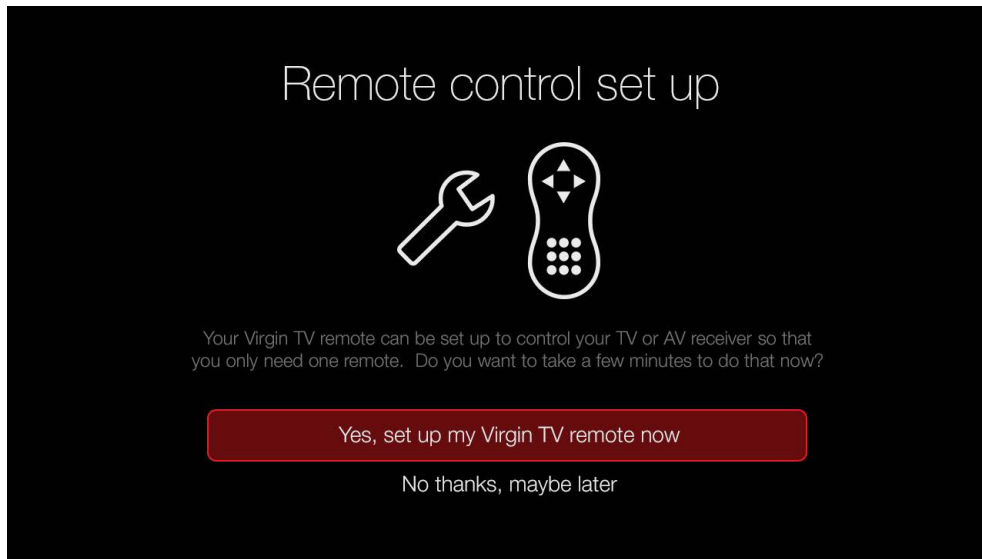
1. The app loads and the user is prompted to either set up the remote or quit.
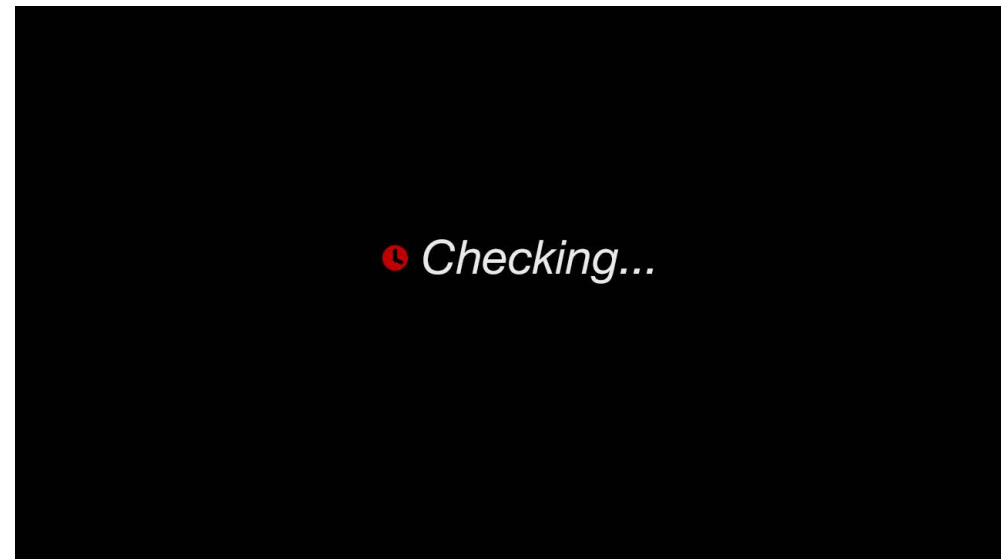
2. OK pressed. App attempts to retrieve EDID via the HDMI cable.
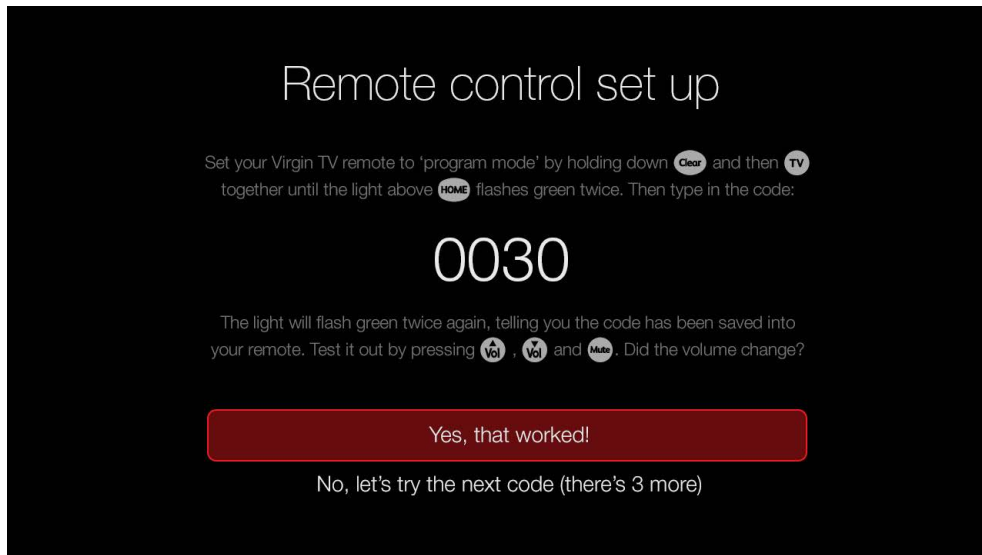
3. The app has detected a TV made by Samsung and displays the first of 4 matching codes (n.b the app will only display a maximum of 5 codes [configurable] that are returned from the server for the auto-detect method). The user tests the first code and it works, so they press OK on 'Yes.'
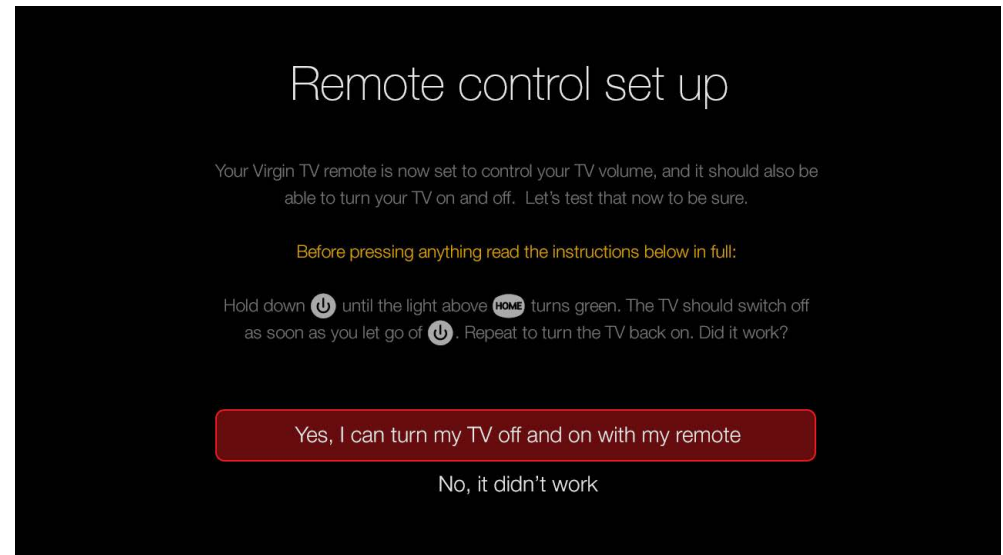
4. Now that it's confirmed the volume works the user is prompted to test control of their TV power with the POWER button. If it works the user gives feedback indicating success, which quits the app.

Example User Journey 2: Best case scenario with Auto Detect on an AV Receiver
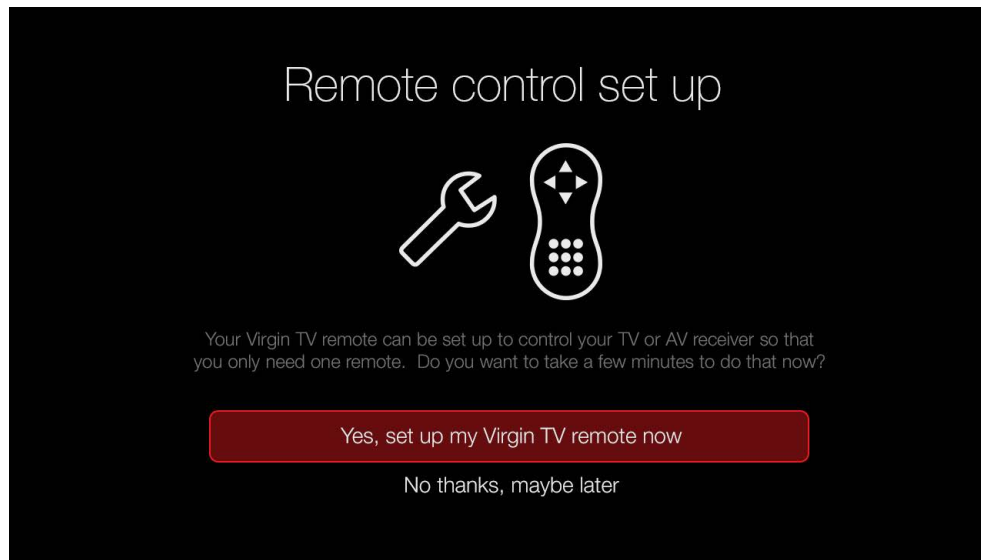
1. The app loads and the user is prompted to either set up the remote or quit.
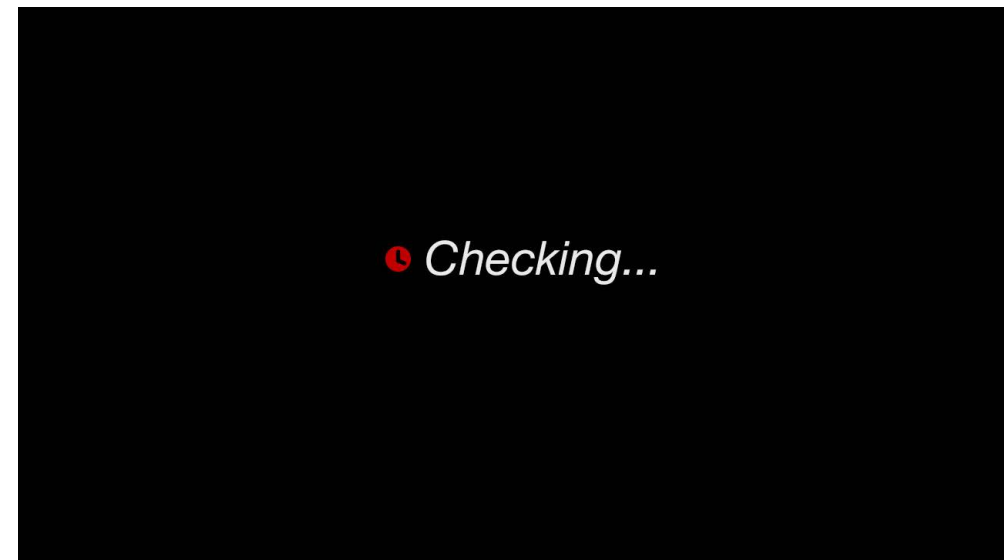
2. OK pressed. App attempts to retrieve EDID via the HDMI cable.
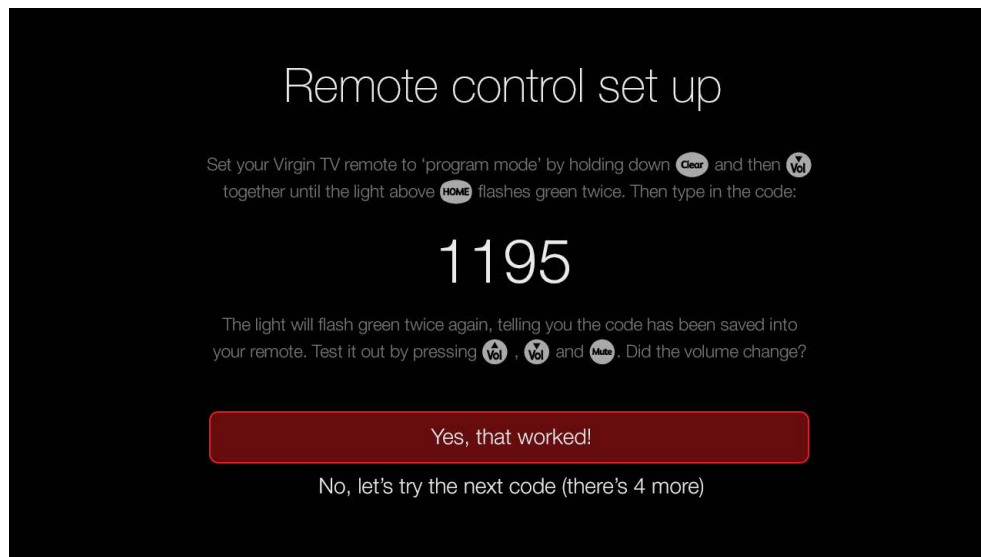
3. The app has detected an AV revceiver made by Panasonic and displays the first of 5 matching codes. The user tests the first code and it works, so they press OK on 'Yes.' (n.b. the instruction for putting the remote into program mode differs for AV receivers: CLEAR and VOLUME is pressed instead of CLEAR and TV. The Virgin TV remote also cannot control the power of the AV receiver, so there's no need to test for that).

Example User Journey 3: Auto Detect returns TV codes that fail, but a Manual Search works
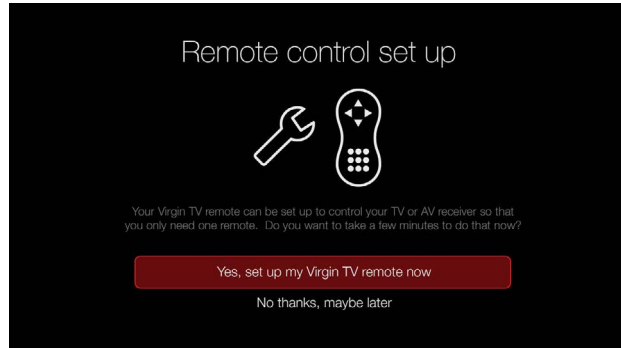
1. The app loads and the user is prompted to either set up the remote.

2. OK pressed. App attempts to retrieve EDID via HDMI cable.
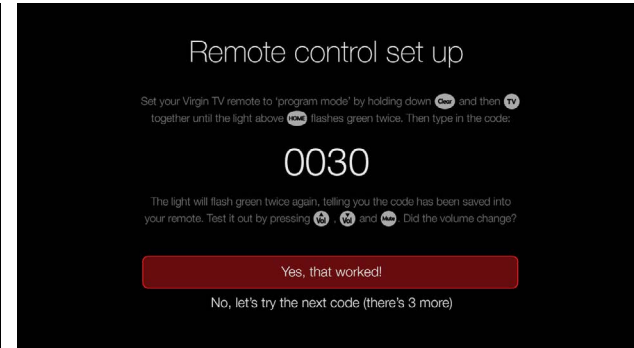
3. The app has detected a TV made by Samsung (an error in this case) and displays the first of 4 matching codes. The user follows the on-screen instructions and enters the code into their remote.
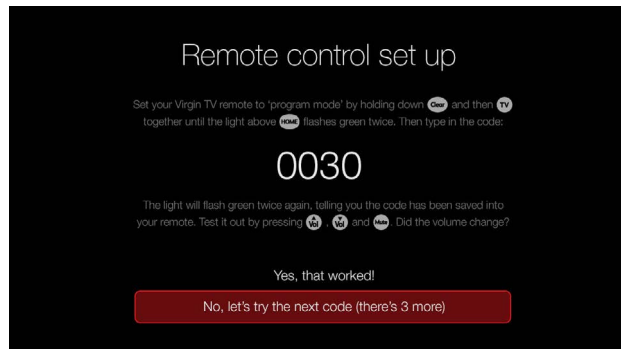
4. The user finds the code doesn't work. User presses DOWN and prepares to try the next code.
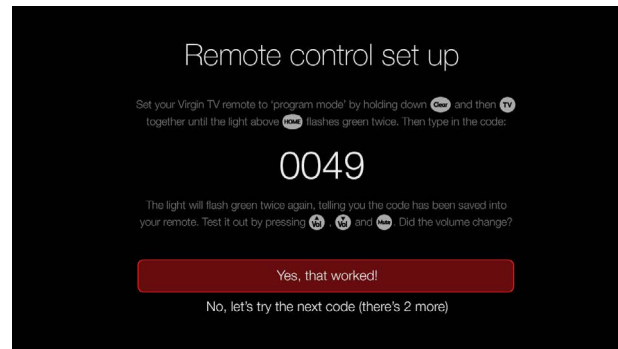
5. OK pressed. The user tries this code.
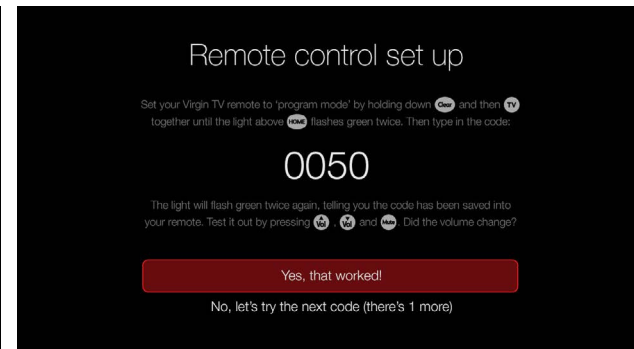
6. DOWN and OK pressed...the last code didn't work, so time to try the next one. Note at the bottom it indicates there's one left in the set.
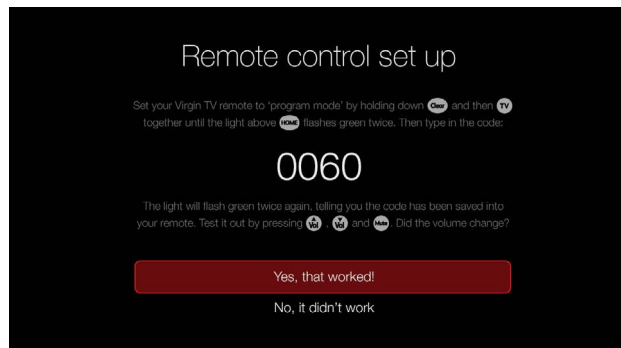
7. DOWN and OK pressed. Previous code was unsuccessful. Last code to try in this set.
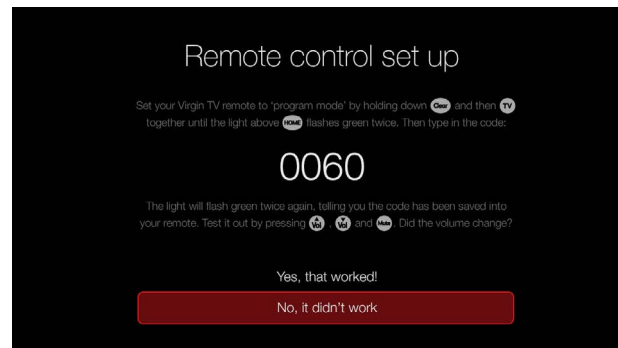
8. This code also fails. DOWN pressed.
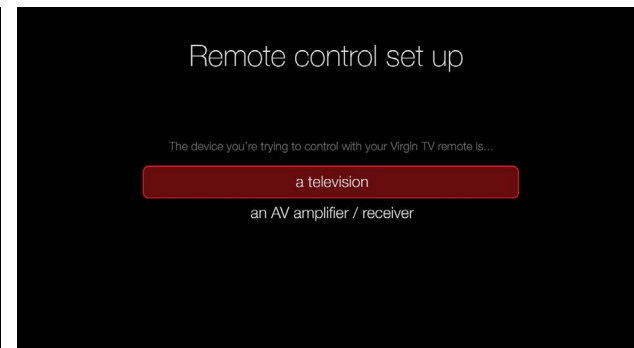
9. OK pressed. The app now guides the user through a more manual search. First the user specifies the kind of device they are trying to control and the codes are filtered accordingly.

Example User Journey 3: Auto Detect returns TV codes that fail, but a Manual Search works
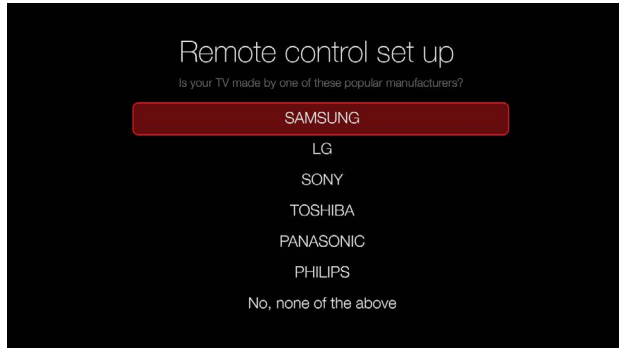
Remote control set up
Is your TV made by one of these popular manufacturers?

SAMSUNG
LG
SONY
TOSHIBA
PANASONIC
PHILIPS
No, none of the above

10. OK pressed (user chose 'a television'). The app prompts the user to choose from a popular set of TV brands (saving them the trouble of having to type it in).

Remote control set up
Is your TV made by one of these popular manufacturers?

SAMSUNG
LG
SONY
TOSHIBA
PANASONIC
PHILIPS
No, none of the above
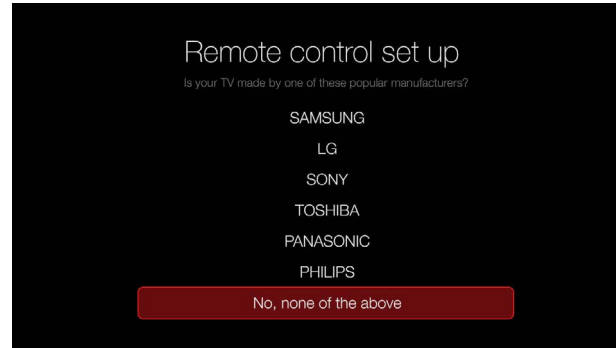
11. DOWN pressed 6 times. The user has an Hitachi, which is not on the list of popular brands.

Remote control set up

A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z   Delete

Enter the first few letters of your device manufacturer and a list will appear to choose from.

Type by using the on-screen keyboard or use the NUMBER buttons on your Virgin TV remote to enter a letter (press ❷ once for A, twice for B, three times for C, and so on).

Press ◀ to delete a letter.
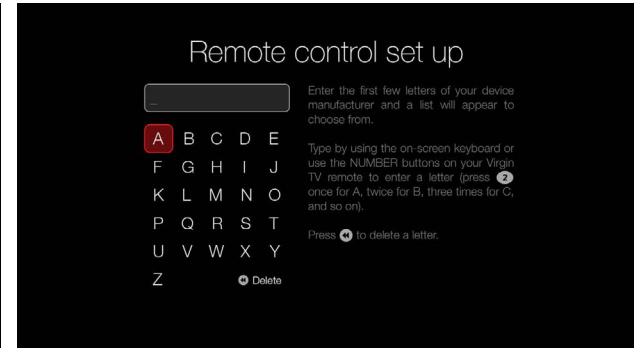
12. OK pressed. A flashing underscore prompts type entry. On screen instructions tell the user how to type with their remotes, including the multi-tap method using the NUMBER buttons.

Remote control set up

G

A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z   Delete

Enter the first few letters of your device manufacturer and a list will appear to choose from.

Type by using the on-screen keyboard or use the NUMBER buttons on your Virgin TV remote to enter a letter (press ❷ once for A, twice for B, three times for C, and so on).

Press ◀ to delete a letter.
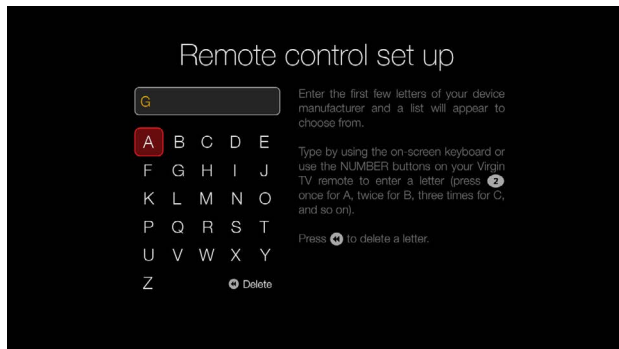
13. '4' pressed, typing a G (the user has opted for the multi-tap method of typing instead of the keyboard). While cycling through the letters for a key the text turns yellow and the leading underscore hides.

Remote control set up

H

A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z   Delete

Enter the first few letters of your device manufacturer and a list will appear to choose from.

Type by using the on-screen keyboard or use the NUMBER buttons on your Virgin TV remote to enter a letter (press ❷ once for A, twice for B, three times for C, and so on).

Press ◀ to delete a letter.
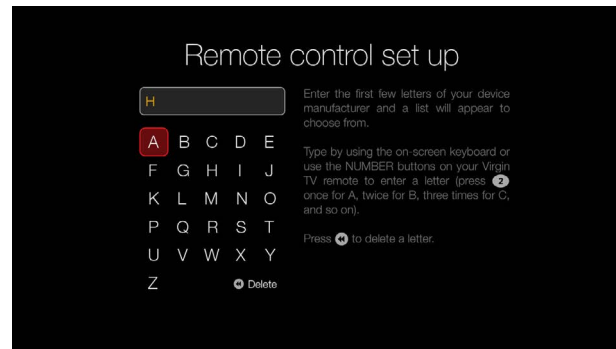
14. 4 pressed again, typing an H.

Remote control set up

H_

A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z   Delete

Enter the first few letters of your device manufacturer and a list will appear to choose from.

Type by using the on-screen keyboard or use the NUMBER buttons on your Virgin TV remote to enter a letter (press ❷ once for A, twice for B, three times for C, and so on).

Press ◀ to delete a letter.
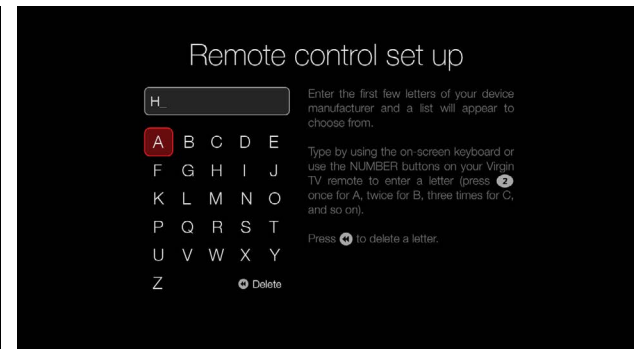
15. User is idle for 800ms. The letter 'H' is entered into the field. The text turns back to white and the flashing underscore re-appears.

Remote control set up

H_

A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z   Delete

H&B
HAAZ
HAIER
HALIFAX
HAMMERSTEIN
HAMPTON
HANIMEX
HANNS-G
HANNSPREE
HANSEATIC
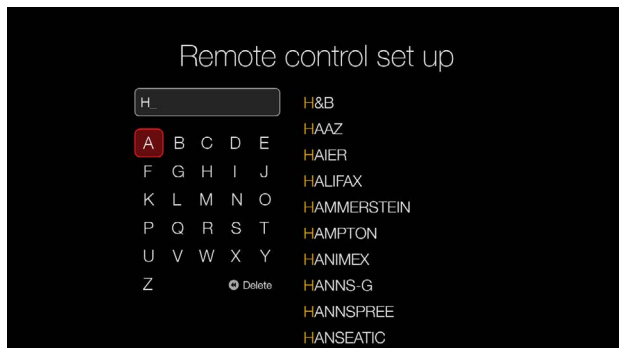
16. Results appear immediately, showing TV brands that begin with 'H'. Note the search string is marked in yellow in the results. The results list is scrollable.

Remote control set up

HI_

A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z   Delete

HICON
HIFIVOX
HIGASHI
HIGHLINE
HIKONA
HILINE
HINARI
HISAWA
HISENSE
HIT
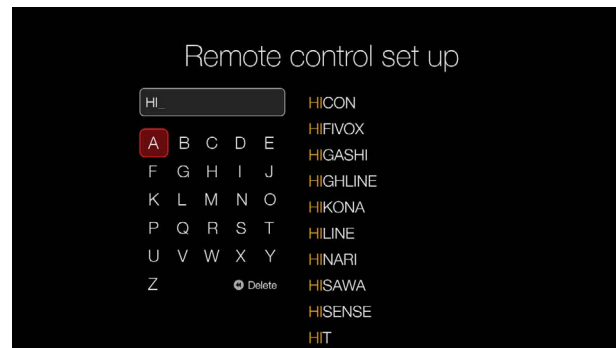
17. The user types the letter 'I', and results show brands beginning with 'HI'.

Remote control set up

HIT_

A B C D E
F G H I J
K L M N O
P Q R S T
U V W X Y
Z   Delete

HIT
HITACHI
HITACHI FUJIAN
HITSU
None of the above
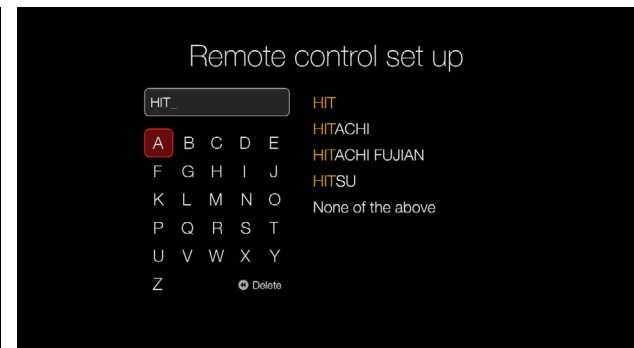
18. The user types the letter 'T' further filtering the list. 'Hitachi', the user's brand, is now visible. Note 'None of the above' is at the bottom of the list in case the user does not see their brand.
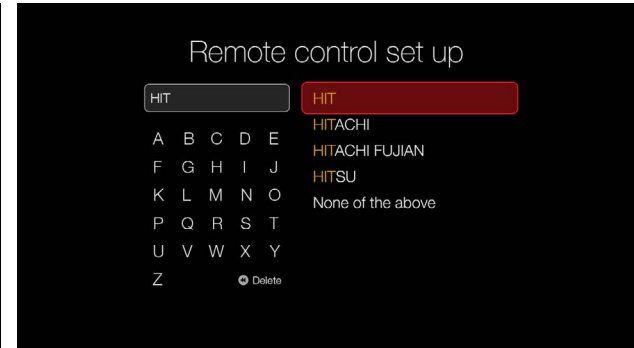
Example User Journey 3: Auto Detect returns TV codes that fail, but a Manual Search works
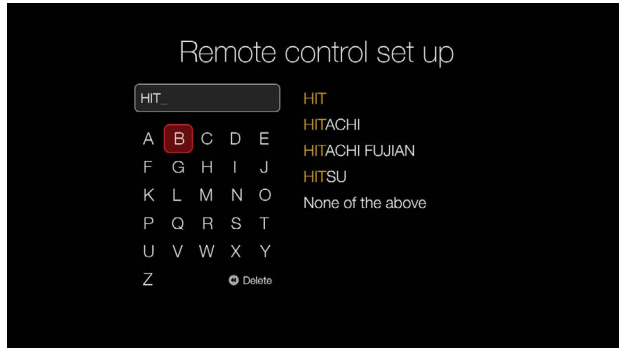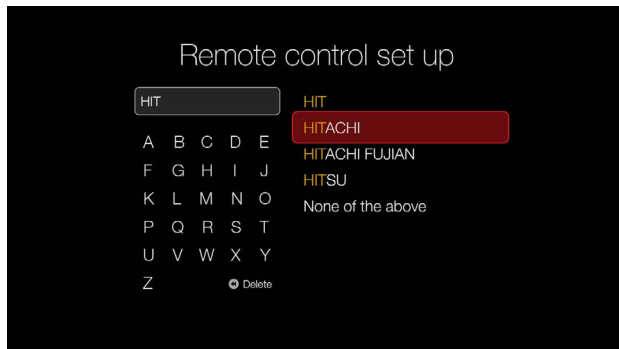

19. RIGHT pressed. The user is navigating to the results.
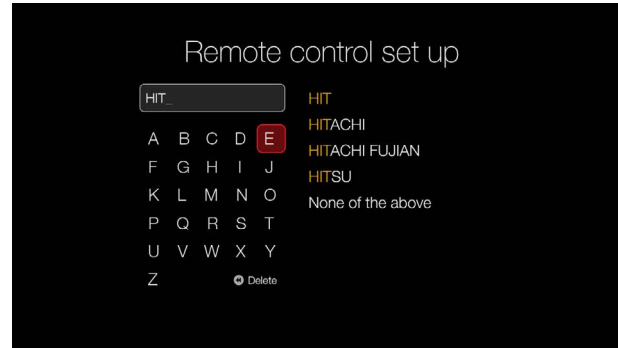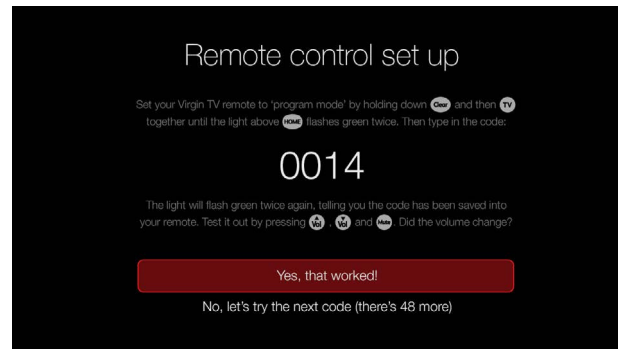


20. RIGHT pressed 3 times.

21. RIGHT pressed again. The flashing underscore hides when the user highlights the results because the app isn't prompting the user for text entry.


22. DOWN pressed.

23. OK pressed. The first code for Hitachi TVs is displayed. The user follows the on-screen instructions and enters the code into their remote. (Note that the user is now presented the *full* list of codes for this manufacturer [48] when using the Manual Search method)
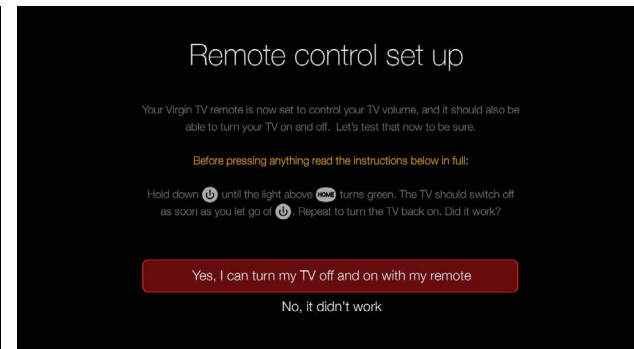
24. OK pressed. The code worked. The user now tests if the POWER button turns their TV off and on. It does indeed work, so the user presses OK and the app quits.

Example User Journey 4: Auto Detect fails for an AV receiver, but a Manual Search works
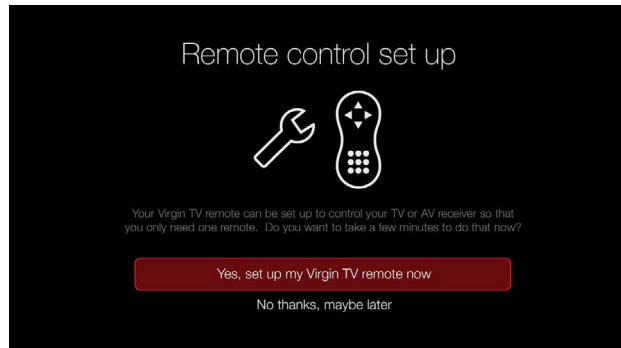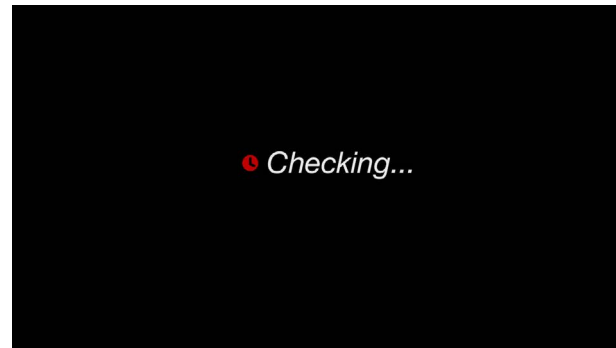
1. The app loads and the user is prompted to either set up the remote.

2. OK pressed. App attempts to retrieve EDID via HDMI cable.
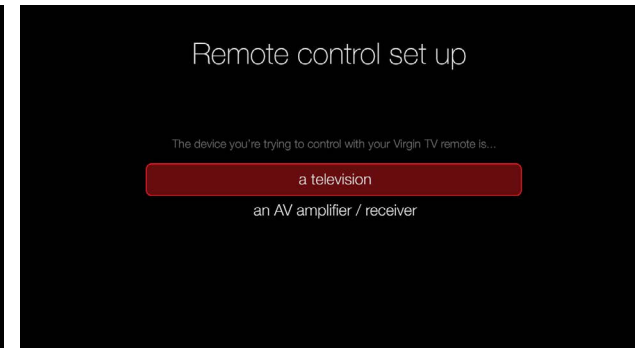
3. Useful EDID information isn't obtained, so user is prompted for information about their device.
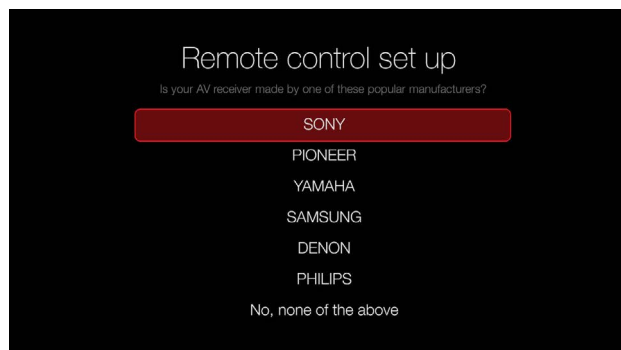
4. DOWN and OK pressed (user chose AV receiver). User is prompted to choose from a list of popular brands.
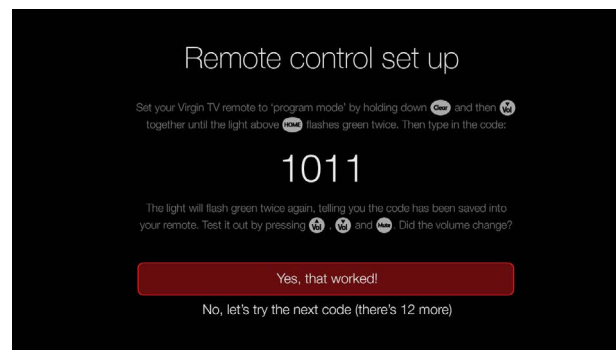
5. OK pressed (the user is aware they have a Sony amp). The user follows the instructions and finds the first code presented works. OK is pressed the app quits.

Example User Journey 5: Auto Detect and Manual Search on a TV fails, but Scan Search works for volume control
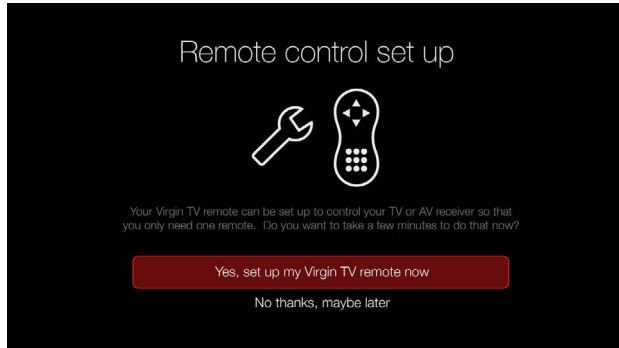
1. The app loads and the user is prompted to either set up the remote.
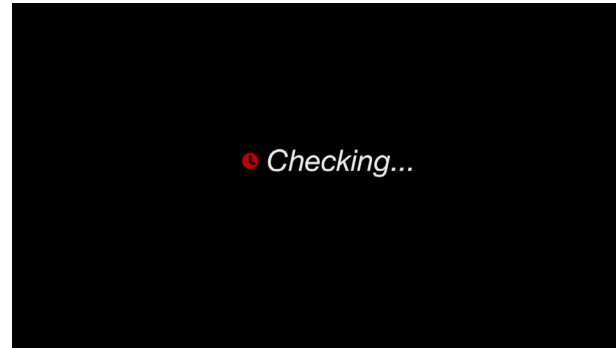
2. OK pressed. App attempts to retrieve EDID via HDMI cable.
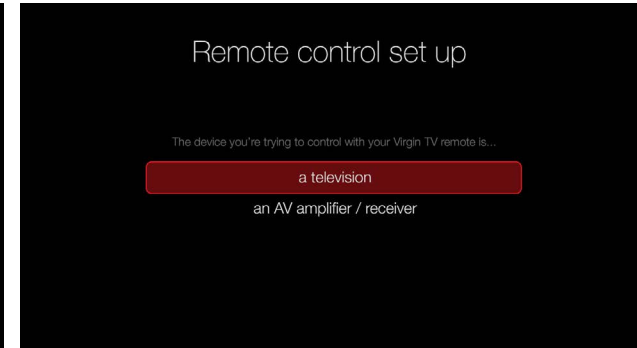
3. Useful EDID information isn't obtained, so user is prompted for information about their device.
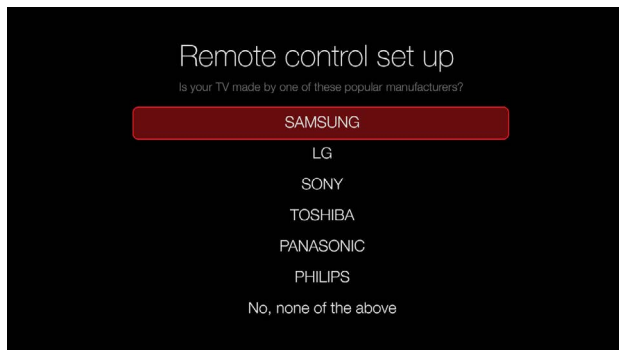
4. OK pressed (user chose 'a television'). The app prompts the user to choose from a popular set of TV brands (saving them the trouble of having to type it in).
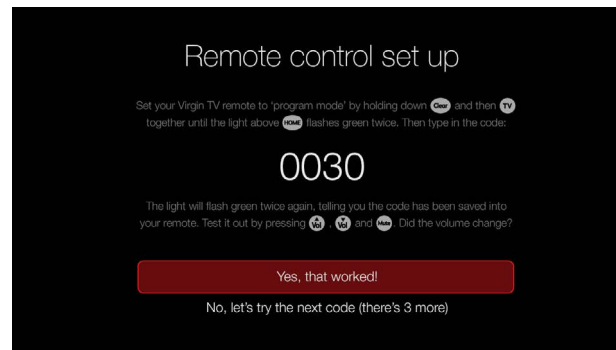
5. OK pressed ('SAMSUNG' was chosen). User follows instructions, but this code doesn't work.
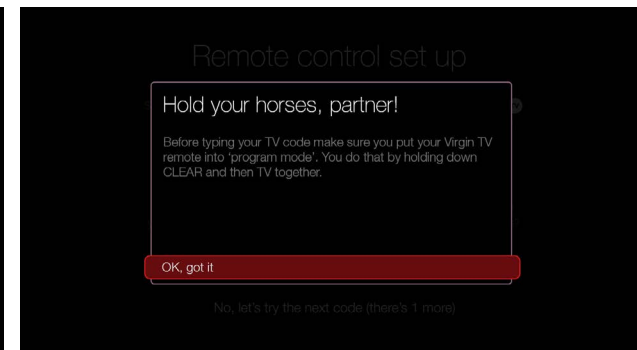
6. While entering one of the codes the user accidentally forgets to put their remote into program mode. The app detects this and presents this error. The user presses OK to dismiss it and tries more codes.
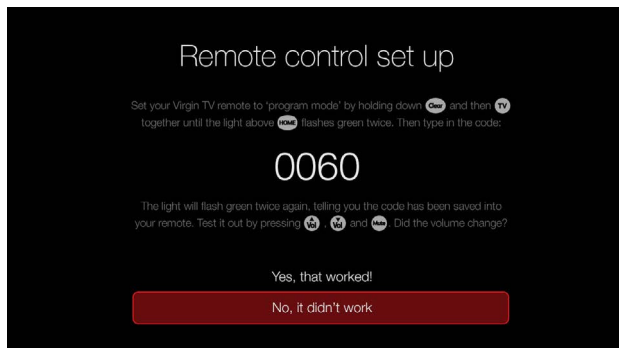
7. DOWN and OK pressed multiple times. The user has tried all the codes presented and none worked.
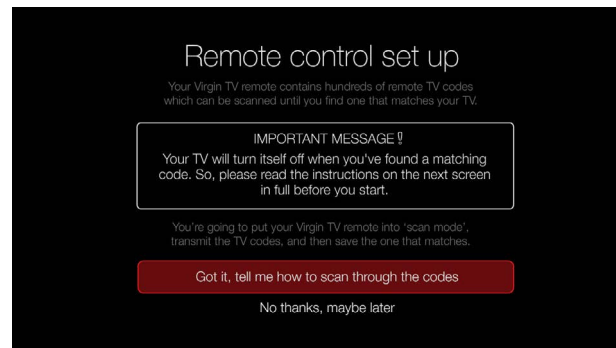
8. OK pressed. User is guided to the last and final look-up method.

9. OK pressed. User follows instructions and scans through the codes stored in the remote. The user finds the matching code. (Note SKIP FWD being used to advance...this because app may not respond to OK button while in program mode).

Example User Journey 5: Auto Detect and Manual Search on a TV fails, but Scan Search works for volume control
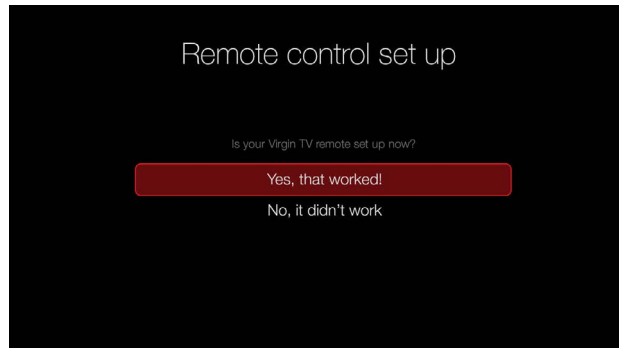
10. SKIP FWD pressed. User is prompted for feedback about success (n.b. the app can't record which code was successful at this point, but the data can be used to tally the number of successful Scan Searches).
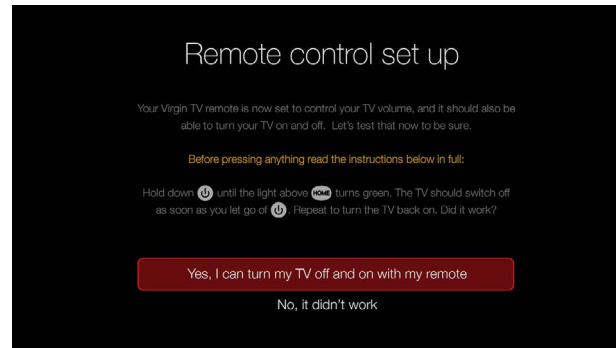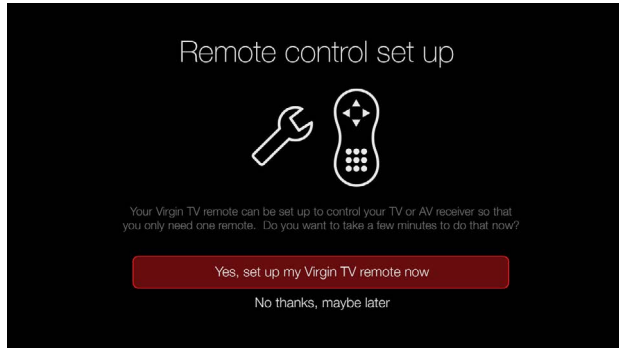
11. OK pressed. App instructs user to test to see if they can control the power of the TV with their Virgin TV remote.
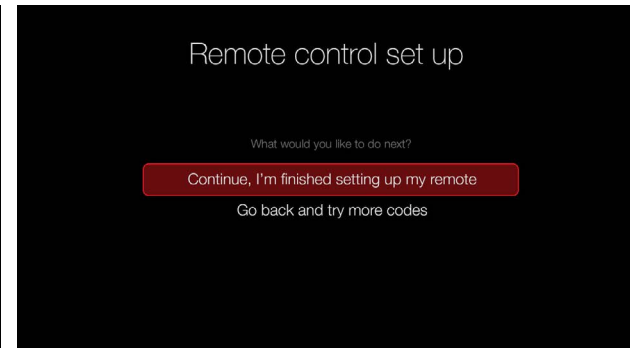
3. DOWN and OK pressed, as the last test wasn't successful. The user decides they are satisfied with volume control alone and presses OK on 'Continue' and quits the app.

Example User Journey 6: All attempts to control an AV receiver fail

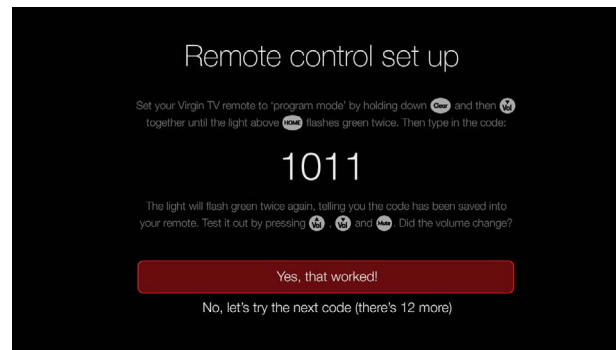1. The app loads and the user is prompted to either set up the remote.
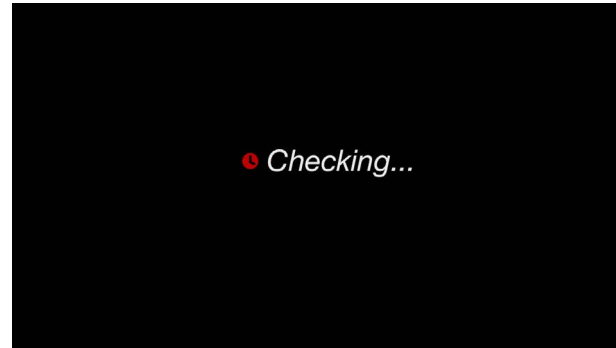
2. OK pressed. App attempts to retrieve EDID via HDMI cable.
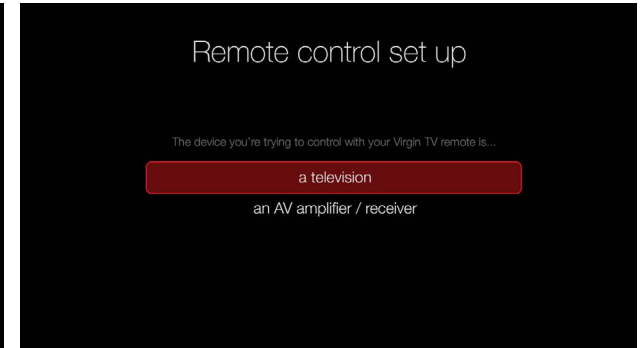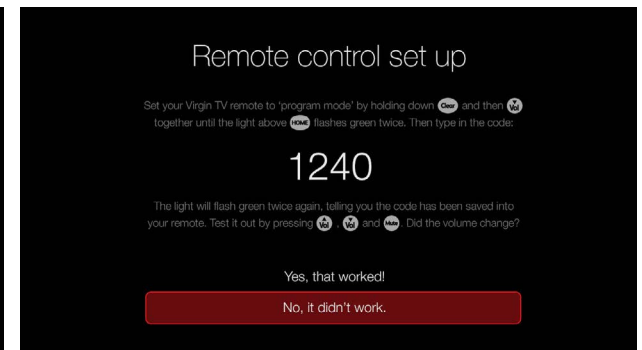

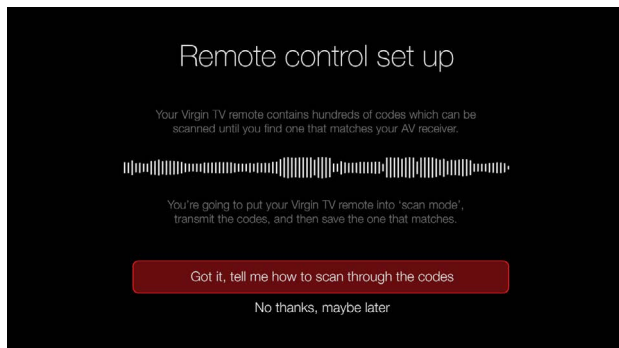3. Useful EDID information isn't obtained, so user is prompted for information about their device.
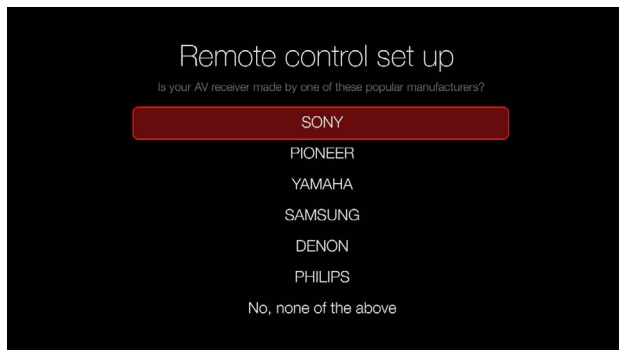
4. DOWN and OK pressed (user chose AV receiver). User is prompted to choose from a list of popular brands.
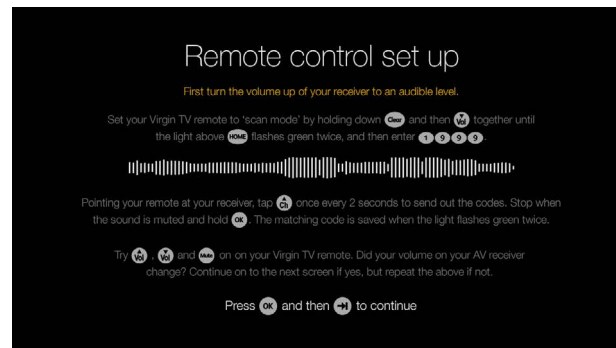

5. OK pressed (the user is aware they have a Sony amp). The user follows the instructions and tests the code.


6. DOWN and OK pressed multiple times, as all the codes don't work.

7. OK pressed. User is guided through the final look-up method. Ambient music plays with synced audio spectrum animation (suggest this is a pre-rendered looped MP4 video clip).
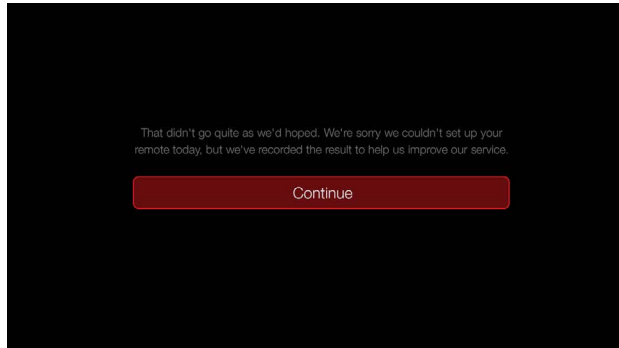

8. OK pressed. User follows instructions and scans through the codes stored in the remote. The music clip helps the user detect if the AV receiver mutes when a matching code is found.
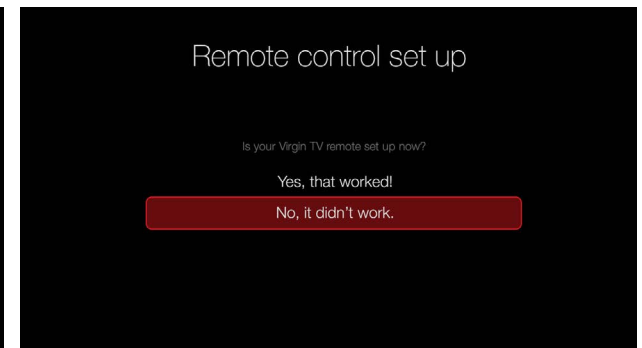
9. SKIP FWD and DOWN pressed. The user was unsuccessful.

Example User Journey 6: All attempts to control an AV receiver fail

10. OK pressed. All attempts have been exhausted, so the app offers
    an apology. The user presses OK and the app quits.