Which Wi-Fi Media Box?

A detailed comparison of the ConnectBox, LightStream Pocket, MicroPi and BibleBox Pi

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Martin Lange
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Introduction

How do you get digital resources into the hands of people who aren't connected to the Internet? How do you distribute apps, videos, audio, documents, and images to people who can't afford the data it would take to download those materials? What if those people live in remote areas where they don't have access to a cellular network?

The key to distributing digital content is a Wi-Fi connection that acts like the Internet—but isn't. These units, generically referred to here as "Wi-Fi Media Boxes," show up on a user's device as a Wi-Fi network. Yet the content offered is only what the owner of the unit loads into the memory of the Wi-Fi Media Box. Users cannot connect to the Internet through them.

Several options are currently available as of September 2020: The ConnectBox, The LightStream Pocket, The MicroPi and The BibleBox Pi. Each costs less than $100 USD, and has its advantages and disadvantages. This paper is a review of each unit and a detailed comparison of the features each one offers compared to the others. The purpose is to help readers learn more about each unit so they can choose the one that best meets their particular needs.

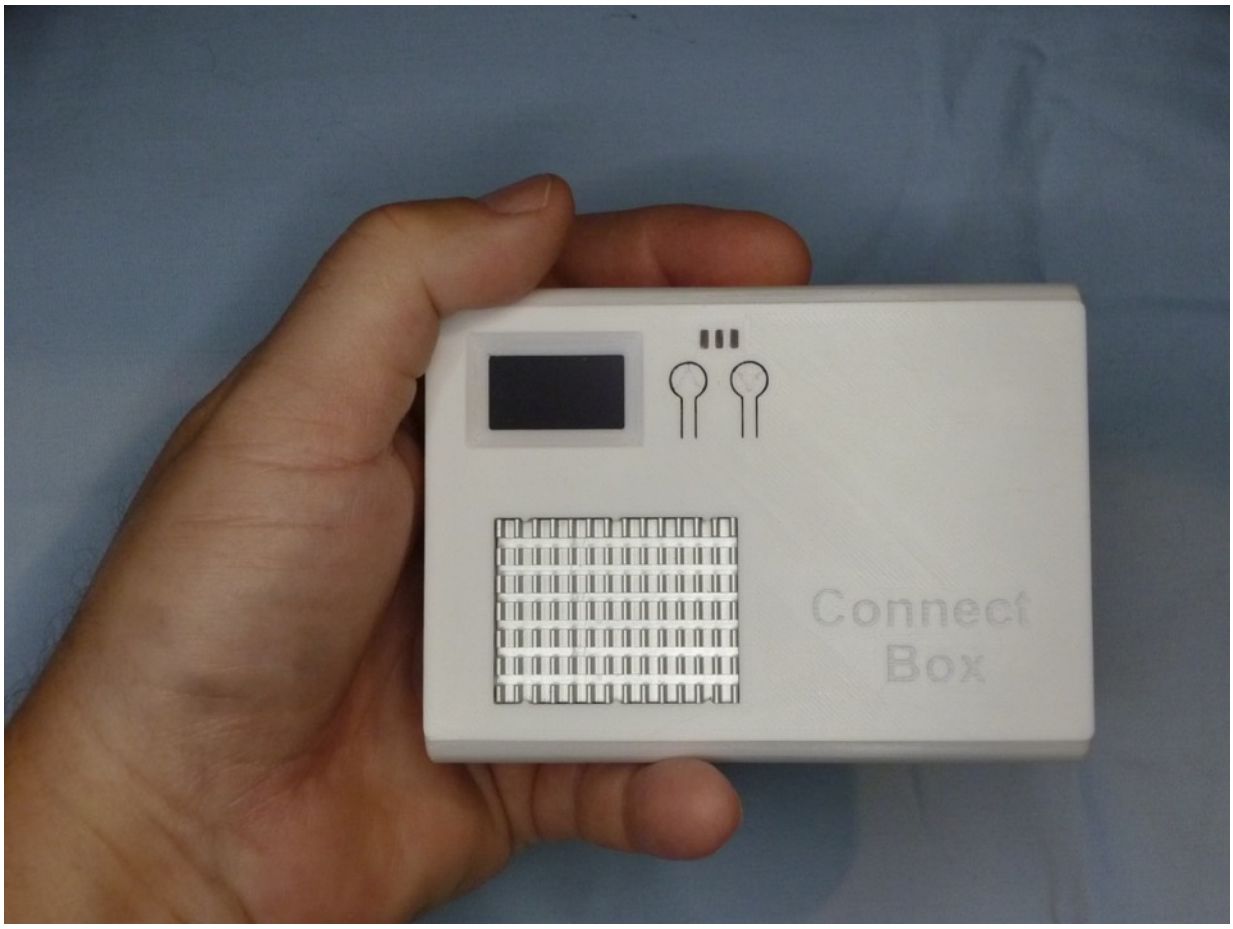
History

Some readers may remember the original "BibleBox" project put forth by Campbell Smythe in 2014. It was a firmware modification, based on the PirateBox and LibraryBox projects, that was applied to a few commercially available TP-Link Wi-Fi routers. The most commonly used was the TL-MR3040, which was battery-operated and about the size of a deck of cards. But, as happens with all commercially produced devices, the TL-MR3040 came to the end of its production run.

The original TP-Link TL-MR3040 BibleBox

All of the devices evaluated in this paper have stepped in to fill that gap.

The ConnectBox



Introduction

The ConnectBox is a simple but powerful tool. It is designed to make it easy to offer content via a Wi-Fi connection, and made for people who don't like to read manuals. A thumb drive loaded with content is all that is needed to get started. Plug it into the ConnectBox, and turn it on. Users can connect and begin accessing the content immediately.

The ConnectBox project is headed by Kirk Wilson, formerly of Operation Mobilization and a consortium of other ministries and volunteers. It was started in 2017, when a group of BibleBox and Media Library Box users gathered to give input about what they would like to see in a device when the TP-Link hardware, which was the basis of these two units, was no longer available.

What Does It Do?

The ConnectBox offers media content to connected users. Users can download or stream video and audio files, view and download images and documents, and download Android apps.

How Does It Work?

The ConnectBox can be used in two ways: to show the contents of a thumb drive in an easy-to-use a graphical interface, or to allow the display of a custom-designed HTML websites without being connected to the Internet. The latter allows the administrator or owner of the device to develop language-specific, event-specific, or purpose-specific websites for users to engage with.

Connecting to the ConnectBox is simple. Turn it on and connect to its Wi-Fi signal. Pop-up windows show the user how to connect their browser to the interface. Once that is done, the user sees the folders and files available for downloading or streaming.

The ConnectBox is designed to handle 15-25 simultaneous users. However, if all of those users attempt to download files at the same time, they will all see a decrease in download speed. When only one user is connected, a one-hour movie file (300 MB) downloads in approximately one minute 10 seconds. The ConnectBox is designed to have up to 17 people simultaneously streaming video.

Device Administration

The admin panel is very spartan. Once logged in, the administrator has just a few options available to modify. The SSID name can be changed here, as can the system password. Usage statistics are available too, to name some of the options.

When a change is made, it is immediately implemented without the need to reboot the ConnectBox.

The device itself has a small OLED display and two buttons. The display, at first glance, shows how many users are connected, the firmware version, how much battery remains (percentage), and the temperature of the CPU. The two buttons allow the user to cycle through a series of screens that give specific information about temperature, battery life, CPU usage and other statistics. The buttons can also be used to copy all of the files from the USB to the internal memory, or vice versa.

The ConnectBox's firmware can be updated, but it is not a simple process. A step-by-step guide is available to walk an administrator through the procedure.

Other Observations

The ConnectBox ships with 64 GB of internal memory. Files can be copied to the internal memory and offered to users. It also accepts any thumb drive. The contents of the internal drive will not be displayed when a USB drive is plugged in.

The built-in battery will run the ConnectBox for approximately 4 - 6 hours, depending on usage. In a pinch, the ConnectBox can even be used to charge a phone or other device!

A smaller ConnectBox without a built-in battery is also available. This is ideal for locations where portability is unnecessary and the unit will remain plugged into wall power.

Because of the CPU used, which enables up to 17 people to simultaneously stream video, there is a large heat sink incorporated in the case. It gets warm to the touch, but never hot enough to burn.

When used in file view mode, folders can be assigned custom icons. For example, a folder named “Videos” can be given a custom icon that looks like a video camera or a strip of film. Customizing icons is explained in the documentation included with the ConnectBox.

A simple chat feature is available for users to communicate, if desired. The chat feature is unique in that it allows for left-to-right text (like English) as well as right-to-left (like Arabic). The chat is deleted when the unit is powered down or rebooted.

The case is white, which stays cooler when operated in an environment exposed to direct sunlight. If needed, the case can be 3D printed in any color desired by special request. The case itself is available with or without ConnectBox branding. It can also be custom branded upon request. The switch for powering it on and off is flush with the case, making it difficult to accidentally turn on or off.

Opinion

I like the simplicity of the ConnectBox. Load a thumb drive with content, plug it into the ConnectBox, and turn it on. Your content is immediately available to anyone who connects. Connecting to it is easy, especially with the automatic pop-up window that demonstrates how. I also love having the ability to create a beautiful custom interface with HTML and have the ConnectBox display it when a user connects. The documentation is well-written and thorough, making it easy to take advantage of all the built-in features. I found the power switch difficult to access, since it is small and flush with the case. I ended up using a ball point pen to carefully turn it on and off.

Who Is It For?

This unit is best designed for someone who:

- Has content on a thumb drive and wants to plug it in and make it available.
- Wants to buy something off the shelf that is ready to turn on and use without reading a manual.
- Wants to design their own branding and custom HTML interface.

Price

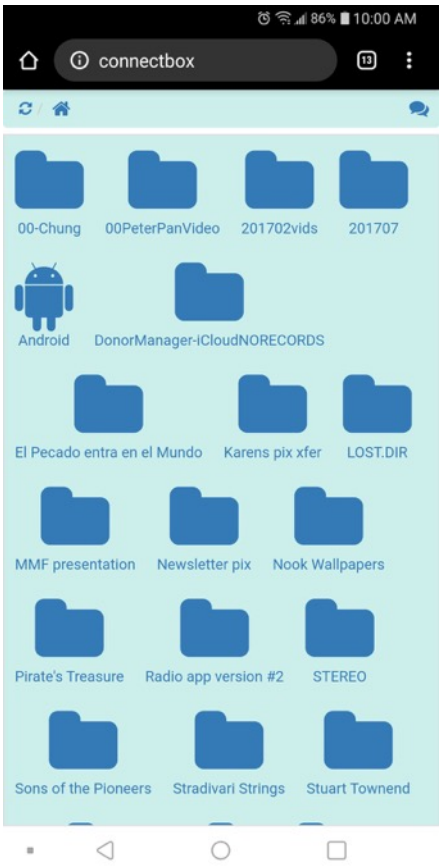
$70.00 USD for the ConnectBox P (with internal battery)
$60.00 USD for the ConnectBox S (without internal battery)

Optional Extras

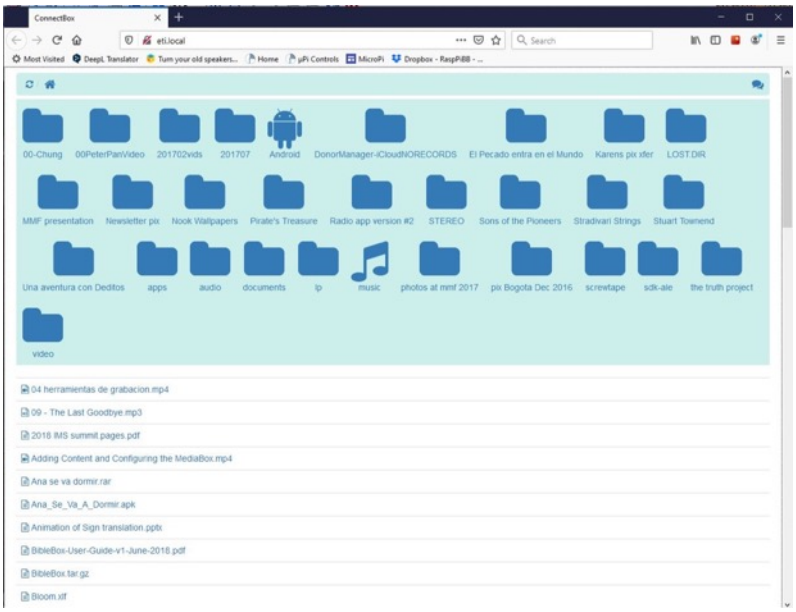
MicroSD slot cover (to hide the internal microSD card).

Website

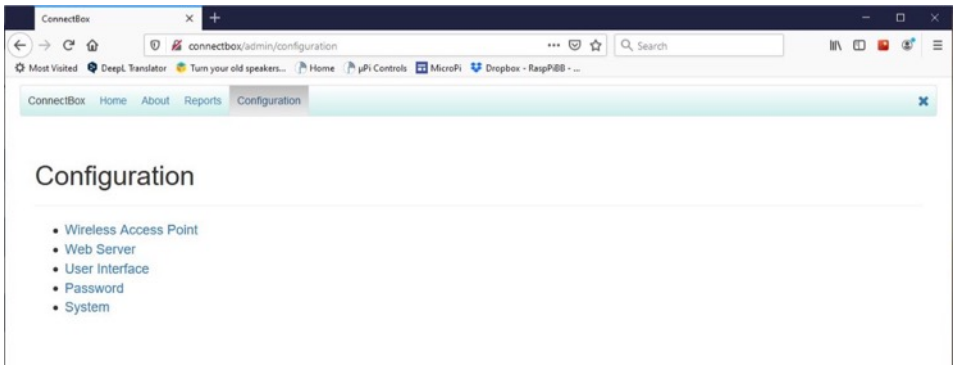
https://connectbox.technology



ConnectBox interface on a phone



ConnectBox interface on a computer



ConnectBox admin interface on a computer

Top Left: ConnectBox P with the LCD display illuminated

Top Right: ConnectBox S with USB thumb drive plugged in

Middle Left: The power switch, USB port and charging port on the ConnectBox P

Middle Right: A size comparison of the ConnectBox P (bottom) with the other units in this evaluation

Bottom: The microSD slot of the ConnectBox P is concealed by the optional card cover

The LightStream Pocket

Introduction

The LightStream Pocket by Renew World Outreach is the Swiss army knife of the Wi-Fi Media Boxes. It looks like an external battery with a few buttons and lights on it. In fact, it can be used as an external battery. But don't be fooled by appearances! Renew's engineers have designed the LightStream to make it easy for people to connect and engage with the content loaded on it.

The LightStream Pocket was first introduced in March 2018. It's predecessor, the Lightstream, was released in June 2014. More information on the original LightStream can be found here (start at 1:07 – 2:28). The lessons learned from the original LightStream were incorporated into the LightStream Pocket to make it the amazing device that it is now.

What Does It Do?

The LightStream is a portable Wi-Fi device that distributes digital resources. Users can download or stream videos and audio files, view and download images and documents, and download Android apps.

How Does It Work?

When users connect to the LightStream's Wi-Fi signal, a pop-up window guides them through the process of connecting to the interface. Once connected, they are greeted with a Netflix-type homepage which displays the available content. While connected, they can download or stream the available content, and chat with the administrator and other users.

The LightStream allows only three simultaneous downloads, in order to keep it from getting overwhelmed by too many download requests. Others who try to download a file are put in a queue and shown a "loading" symbol. An administrator can change the number of allowed simultaneous downloads in the control panel. When only one user is connected, a one-hour movie file (300 MB) downloads in approximately 51 seconds.

Device Administration

For the administrator of the LightStream, a myriad of options are available for managing and presenting content. The LightStream offers six languages for the admin panel interface: Spanish, French, Russian, Chinese, Arabic, and English. Once logged in to the admin panel, a web interface shows the statistics for files downloaded and streamed. It also shows all of the recent connections to the LightStream. The interface is easy to understand and navigate.

Uploading content and creating folders is done with just a few mouse clicks. Content can be organized by folder, language, or both. As content is being added, an indicator shows the amount of available space remaining on the device. If the administrator is unsure of how a particular feature works, clicking the help button will take them to information explaining each item on the interface in the language of the interface. Renew offers several tutorial videos on their website that demonstrate how to administer the Lightstream via the admin interface.

The LightStream is easily upgraded. Since new features continue to be added on a regular basis, the developers have included a very easy update process in the admin panel. Documentation on how to upgrade the firmware of the LightStream can be found on their website.

Other Observations

There are several features not found in the other units, such as automatically downloading content directly to the LightStream from the JESUS Film Project, and chatting with connected users. It offers the ability to turn off downloading and force users to only stream content.

The device itself has features that can be accessed by pressing a button or two. The battery level and the number of connected users are indicated with small blue LEDs. It is possible to copy content from the LightStream directly to a microSD card simply by inserting the memory card into the LightStream. Nothing is deleted from the microSD card in the process. The content that gets copied is determined in the admin panel. The microSD card can be locked by the LightStream so no other content can be written to it.

Renew World Outreach offers free pre-loading of some content on the unit (an app, a JESUS film, and one more option), making it an easy option for people who want to make content available without learning how to administer the LightStream. For a small fee, more media can be custom loaded before the unit is shipped.

The LightStream Pocket can be purchased either branded (with the LightStream Pocket logo) or unbranded.

Opinion

After spending several hours adding content and customizing the interface of the LightStream, I definitely felt like I was using the "deluxe model" of the Wi-Fi Media Boxes. The interface and built-in helps make it easy to use, even for beginners. The written documentation and the tutorial videos are clear and concise. Owners of LightStreams are notified by email when a firmware update is available. The staff at Renew World Outreach are friendly and eager to help users get the most out of their LightStreams. They have made it very easy for the administrator of the unit to download content directly from the JESUS Film Project website too!

Who Is It For?

The LightStream is designed for someone who wants to:

- Buy something off the shelf that is ready to turn on and use.
- Engage with users in real-time.
- Offer hand-picked content in bite-sized portions.
- Have full control over the interface and resources visible to the user.
- Offer content in several languages.
- Custom-load their own content.

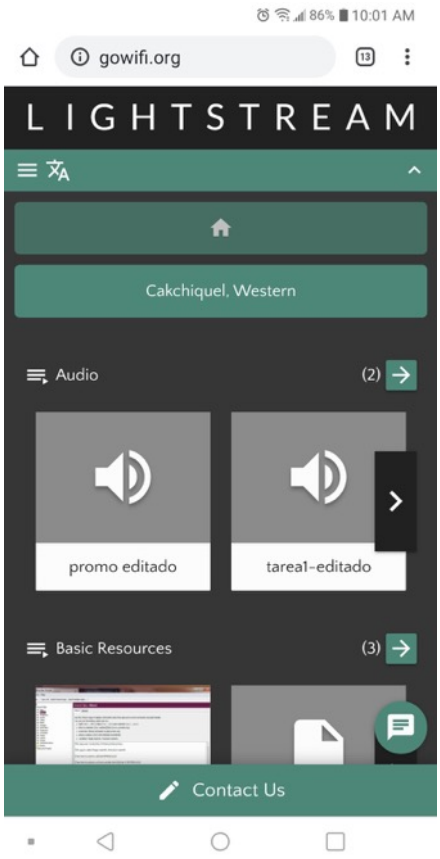
Price

$82.00 USD (16 GB version)
$102 USD (32 GB version)
$122 (64 GB version)

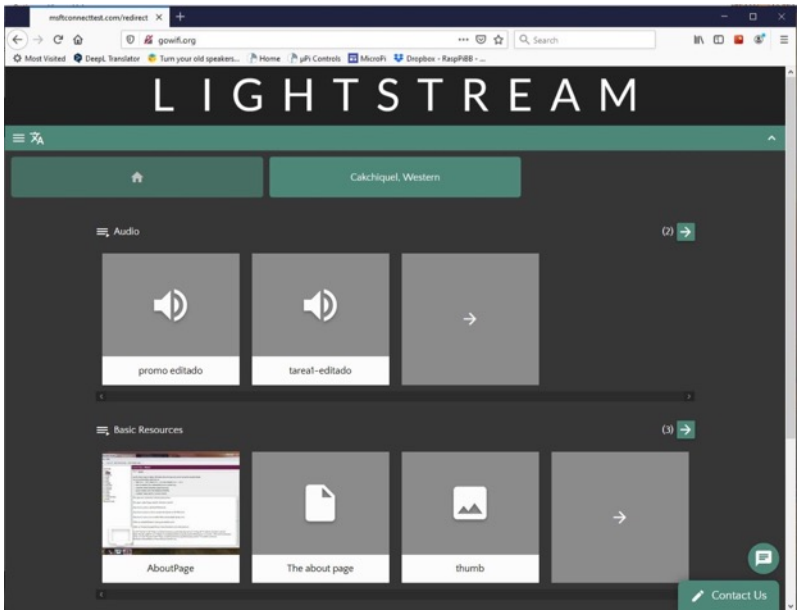
A discount is available on orders of 10 Lightstreams or more.

Website

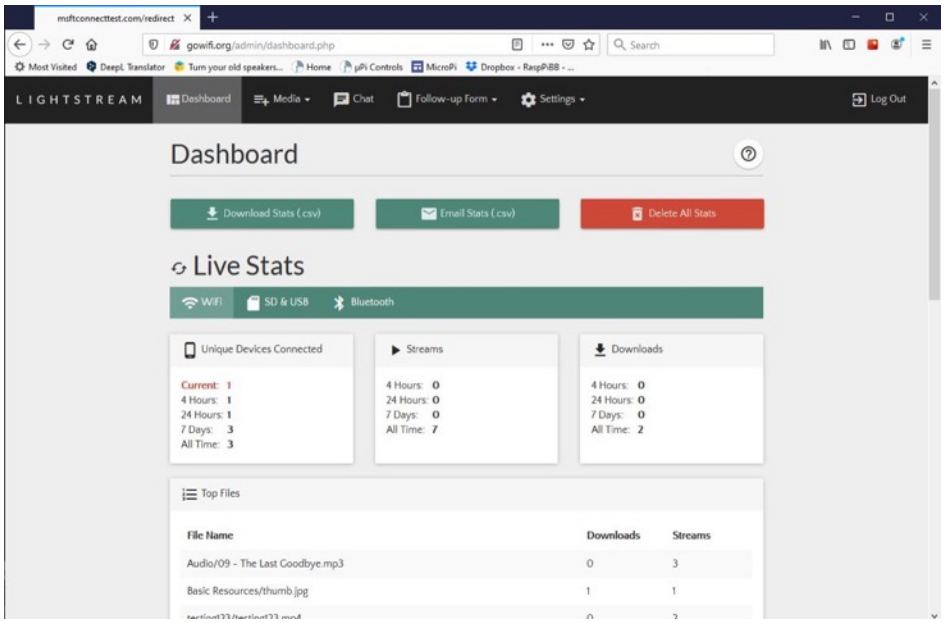
https://renewoutreach.org/lightstreams



Lightstream interface on a phone



Lightstream interface on a computer



Lightstream admin interface on a computer

Top Left: Blue LEDs indicate there are two people connected to the Lightstream Pocket
Top Right: A view of the USB port, microSD card slot and charging port
Middle Right: A size comparison of the Lightstream Pocket (2nd from top) with the other units
Bottom: The power button and the underside of the Lightstream Pocket

The MicroPi

Introduction

The MicroPi is a do-it-yourself Wi-Fi Media Box, offering the same functionality as the other units in this comparison, but for less money. Assembling a MicroPi requires some technical knowledge and the ability to follow the steps laid out in the instructions.

The MicroPi project is the brainchild of Peter Wulfing, who was looking for a way to leverage the size of the Raspberry Pi Zero W for distributing Scripture resources via Wi-Fi. Issues with importing other Wi-Fi Media Boxes led him to look for a solution that could be purchased on Amazon.com and delivered within the country where he was working.

What Does It Do?

The MicroPi offers media content to connected users. Users can download or stream videos and audio files, view and download images and documents, and download Android apps.

How Does It Work?

Anyone wishing to put together a MicroPi must download the software and instructions from the MicroPi website, and purchase the hardware. There are only two items to purchase: a Micro Pi Zero W kit and a microSD card. It is advisable to purchase a 32 GB

microSD card, but depending on how much content will be loaded, the MicroPi can utilize a microSD card up to 512 GB in size.

Once assembled and powered up, it's easy to get connected. A user connects to the MicroPi Wi-Fi signal, opens a browser and presses the "Home" icon. When the main interface opens, the user is greeted with easy to recognize icons: language, video, audio, text, images, apps, contact, and synchro. Tapping on an icon takes the user to a folder containing resources of that type. Each folder can be custom loaded with the specific content the user wishes to distribute.

The MicroPi is designed to handle up to 15 simultaneous users. However, if all of those users attempt to download files at the same time, they will all see a decrease in download speed. When only one user is connected, a one-hour movie file (300 MB) downloads in approximately one minute and 14 seconds.

Device Administration

The documentation is well written and easy to follow. It covers everything from loading the operating system onto the microSD card, first boot, expanding the memory, loading content, and managing the options available to the administrator. The documentation is all located on the MicroPi website.

The administrator of the MicroPi can load content into the pre-established folders, and can create sub-folders to organize the content being offered. Content is loaded onto the MicroPi from a computer using a program like WinSCP (Windows) or Forklift (Mac). Other programs can be used as well.

The admin interface allows the administrator to change the icon and language of the MicroPi's interface. The SSID name can be changed here, as can the name and logo of the website. Three languages are provided: English, Spanish and French. This is also where the MicroPi can be connected to the Internet, which enables it to automatically download content from ScriptureEarth.org and Gospel Recordings Network.

The MicroPi's firmware can be updated, but it is not a simple process. A step-by-step guide is available to walk an administrator through the procedure.

Other Observations

A feature that sets the MicroPi apart from the others is its ability to connect to ScriptureEarth.org and Gospel Recordings Network to download language-specific content. The user needs only to enter the Ethnologue code and language name, and the MicroPi then downloads the files from that language and saves them internally.

The MicroPi also has the ability to connect to an external network and stream to UPnP presentation devices like Smart TVs, set-top boxes, network enabled Blu-Ray players, Roku sticks, and Chromecasts. Most such devices are compatible with the UPnP/DLNA protocol for which the MicroPi is a server device. A practical use of this would be to stream media from the MicroPi to a Smart TV in a clinic or hospital waiting room.

Another mighty feature that the MicroPi offers is “Kiosk Mode.” A MicroPi can be connected to a monitor or television and play samples of content on the device, as well as promotional videos, such as how to connect to the MicroPi. It allows the display of QR codes on the screen so passers-by can scan the code and be taken directly to the video being shown, once they have connected to the MicroPi’s Wi-Fi signal.

A MicroPi Zero W kit, microSD card, and external battery can be purchased on Amazon.com for less than $40 USD. The kit comes with a universal power adapter that works in all countries. The battery allows it to be used as a portable Wi-Fi Media Box.

Opinion

I love this unit! The interface is clean and easy to understand. It is easy to load with content and it’s so inexpensive. The administrator panel allows me to change a few settings without overwhelming me with choices. It’s so small! Even with a small external battery attached, it fits in the palm of my hand. This portability makes it easy to use in a myriad of situations. The “Kiosk Mode” sets this one apart from the others, since it can broadcast samples of its content to people passing by, and give them visual instructions on how to connect to the Wi-Fi signal.

Who Is It For?

This unit is best designed for someone:

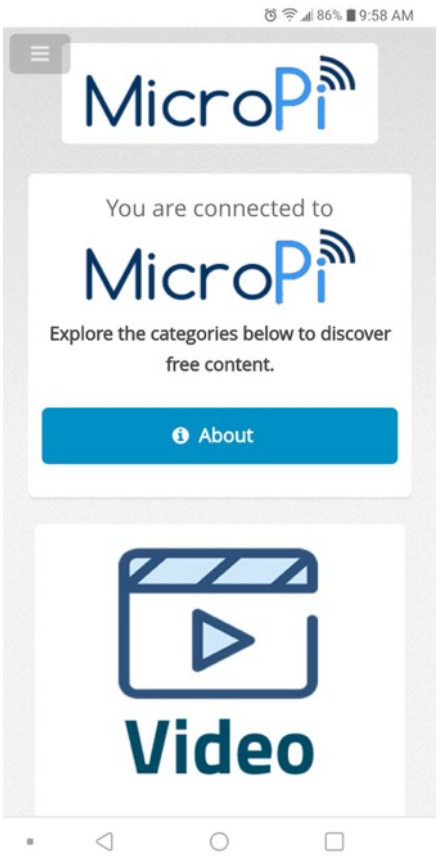
- Not afraid of basic electronics assembly.
- Looking for an economical solution.
- Looking for something inconspicuous and portable.
- Who is a pastor, trainer or promoter that travels to remote locations and needs something small and light that lasts a long time on one charge.
- With a specific language interest - download all resources from ScriptureEarth or Gospel Recordings Network.
- Who needs the functions of a basic wireless file server.
- Who wants to promote connecting to the device and downloading the resources available on the MicroPi via a TV or monitor (store, hospital, bus station, office, etc.)

Price

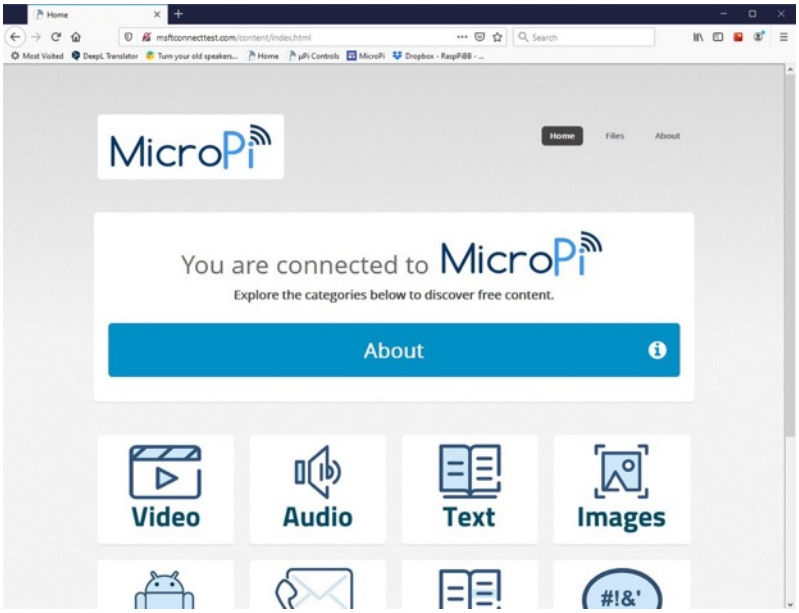
$40.00 USD from Amazon
MicroPi Kit from Amazon
32 GB MicroSD card from Amazon
Optional External Battery for Portable Use:
Rechargeable Battery from Amazon
Solar Rechargeable Battery from Amazon

Website

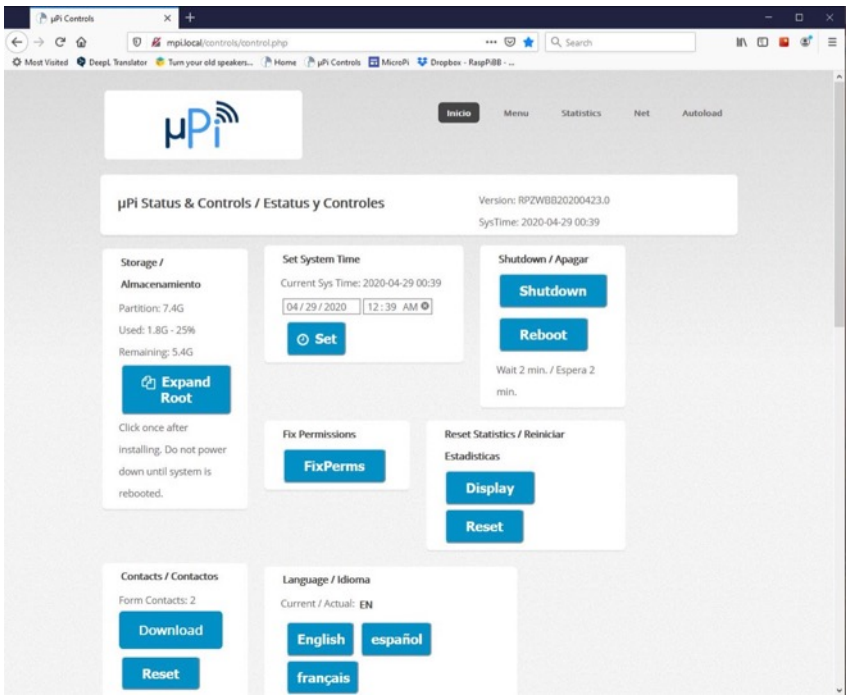
https://sites.google.com/sil.org/micropi



MicroPi interface on a phone



MicroPi interface on a computer



MicroPi admin interface on a computer

Top Left: The MicroPi interface on an Android smartphone

Top Right: Top cover removed from the case, displaying the MicroPi's motherboard

Middle Right: The ports of the MicroPi – only the power port is used (right hand side)

Bottom Left: The MicroPi consists of a case, a motherboard and a microSD chip

Bottom Right: A size comparison of the MicroPi (top) with the other units in this evaluation. Also shown are US 25¢ and Euro 50¢ coins

The BibleBox Pi

Introduction

As a prelude to this review, it must be mentioned that the BibleBox Pi project is no longer being supported by its developer, even though the hardware it is based on is still available.

How Does It Work

The BibleBox Pi is a DIY project based on the Raspberry Pi 3 circuit board. An individual board or a kit can be purchased on Amazon and easily assembled. The user guide and system image are downloaded from www.biblebox.org and the user follows the instructions in the user guide to put the system together. Note that it only runs on the Raspberry Pi 3b or 3b plus. It does not run on a Raspberry Pi 4.

Device Administration

The BibleBox Pi infrastructure is based on the WordPress content management system. If the user is familiar with WordPress, operating and administering the BibleBox will come naturally. If not, the user will have to invest time learning WordPress by watching YouTube tutorials or documentation from wordpress.com.

To administer the content, the user must log in to the WordPress admin interface. The pre-installed content can be deleted and the administrator can add their content. For someone who is unfamiliar with WordPress, the interface can be daunting.

Other Observations

The instructions were a bit difficult to follow at times, but after carefully re-reading them I was able to get the BibleBox Pi up and running. Once connected to the Wi-Fi signal, the browser opens up and makes it clear to the user to tap on the icon to continue. After a five second delay, the user interface appears. It is quite impressive! There is a blog, courses, a list of the download categories, a list of the top downloads, and a featured video. There is a good assortment of sample content that comes pre-loaded.

Opinion

After using the Lightstream, MicroPi and ConnectBox, which have been designed to be easy to use from the beginning, I found the BibleBox Pi somewhat difficult to set up and administer. If someone has a good working knowledge of WordPress, the BibleBox Pi can be configured as a very powerful tool that is highly configurable. But I cannot recommend it for people without that background when there are devices available which are easier to use.

Who Is It For?

This unit is best designed for someone who:

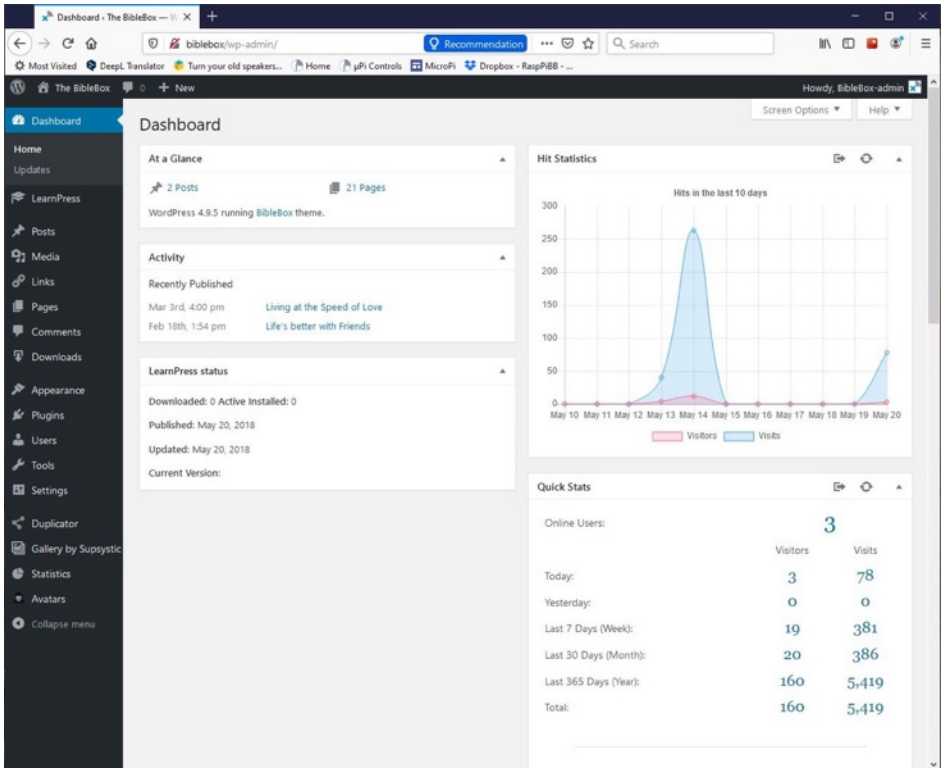
- Has experience with WordPress.
- Has a high level of technical computer skill.
- Needs a hotspot with a customized interface offering the ability for the user to download materials, take courses offline, or stream media content.

Price

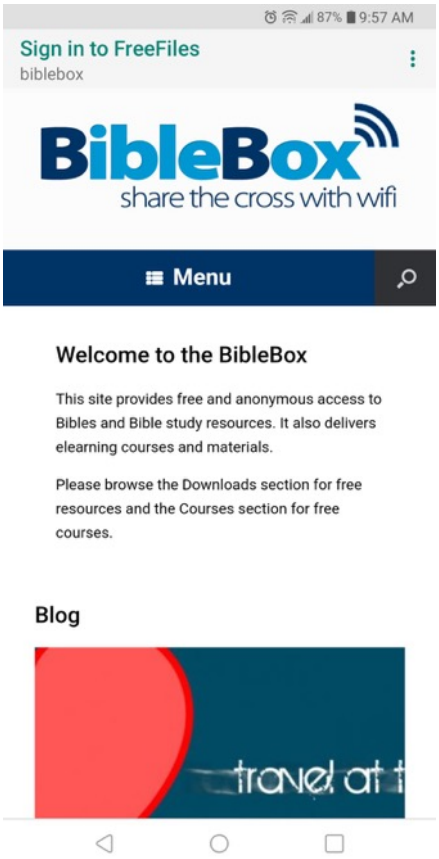
$80.00 USD from Amazon

Website

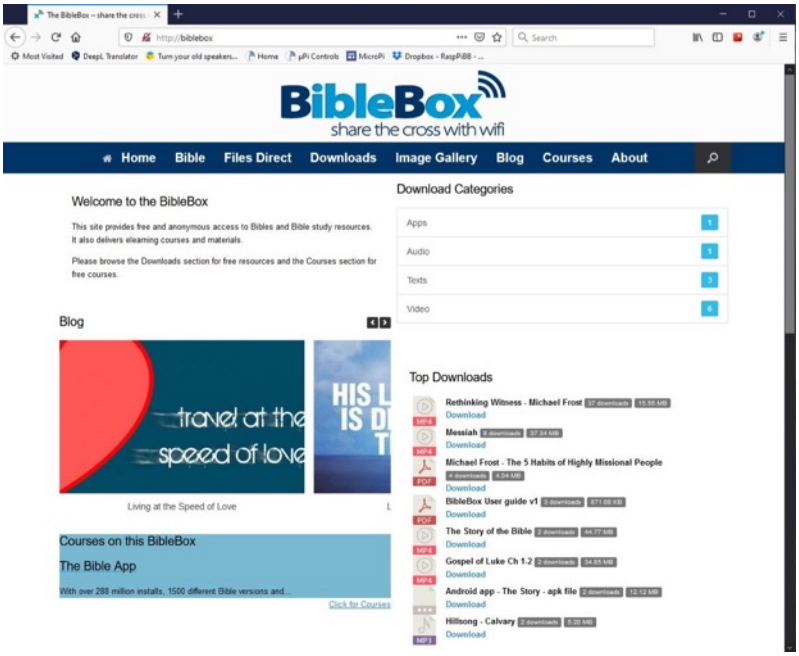
https://biblebox.org/



BibleBox Pi admin interface on a computer



BibleBox Pi interface on a phone



BibleBox Pi interface on a computer

Comparison between the five currently available Wi-Fi Media Boxes - May 2021

	LightStream	ConnectBox-P	ConnectBox-S	MicroPi	BibleBox
Form Factor					
Type of Product	Ready-To-Use	Ready-To-Use	Ready-To-Use	Do-It-Yourself	Do-It-Yourself
Size in inches (L x W x H)	5 ⅛" x 2 ¾" x ¾"	4 ¼" x 3 ¼" x 1 ⅛"	2 ⅞" x 3 ⅛" x 1 ⅛"	3 ⅛" x 1 ½" x ½" (2)	3 ¾" x 2 ½" x 1 ¼" (2)
Size in millimeters (L x W x H)	130 x 70 x 19 mm	109 x 80 x 28 mm	73 x 80 x 28 mm	79 x 38 x 13 mm	95 x 64 x 32 mm
Weight (ounces / grams)	6 oz / 168g	5.7 oz / 162g	3.4 oz / 96g	1 oz / 28g	7.3 oz / 208g
Internal memory	16GB 32GB or 64GB	64GB	64GB	8 - 512GB	8 - 128GB
Branding	with/without	with/without (6)	with/without (6)	without	without
Pre-assembled	yes	yes	yes	no	no
Battery life indicator	yes	yes	n/a	n/a	n/a
Connected users indicator	yes	yes	yes	no	no
External antenna connector	yes	by special request	by special request	no	no
Portable	yes	yes	no (1)	yes	yes
Stationary	yes	yes	yes	yes	yes
Clear documentation provided	yes	yes	yes	yes	somewhat
Included in packaging	user guide, usb cable	charger, usb cable, user guide	charger, usb cable, user guide	n/a	n/a
Optional accessories	bluetooth dongle, solar panel, power adapter, custom content loading	metal security tie wrap, microSD card cover	metal security tie wrap, microSD card cover	n/a	n/a

	LightStream	ConnectBox-P	ConnectBox-S	MicroPi	BibleBox
Power					
Internal battery	yes	yes	no	no	no
Battery run time	approx. 12 hours	approx. 4-6 hours	n/a	n/a	n/a
Power from external battery	yes	yes	yes	yes	yes
Run while plugged into external power	yes	yes	yes	yes	yes
	LightStream	**ConnectBox-P**	**ConnectBox-S**	**MicroPi**	**BibleBox**
Functions					
MicroSD copy	copy and lock	no	no	no	no
Increase/Decrease signal power	no	no	no	yes	no
External USB content	yes (4)	yes	yes	no	no
Admin upgradeable firmware	yes	yes	yes	yes	no
Maximum concurrent connections	20 (5)	30 users or 17 video streams of 380p	30 users or 17 video streams of 380p	undocumented	undocumented
Kiosk Mode	no	no	no	yes	no
Auto shutdown	yes	yes	yes	no	no
Time to download 300mb file	51 sec	1 min 10 sec	1 min 10 sec	1 min 14 sec	untested
	LightStream	**ConnectBox-P**	**ConnectBox-S**	**MicroPi**	**BibleBox**
Interface					
Admin Panel	yes	yes	yes	yes	yes
Captive portal	yes	yes	yes	yes	yes
Require password for user to connect	yes	yes	yes	not yet	no
Multilingual interface	yes	customizeable banner message	customizeable banner message	yes	no

Icon-based interface	yes	yes	yes	yes	no
Statistics	yes (in admin mode)	yes	yes	yes (in admin mode)	yes (in admin mode)
Popular files/last files	yes	yes	yes	yes	yes
Chat box	yes	yes	yes	yes	yes
Contact form	yes (customizeable)	yes	yes	yes	no
Rename SSID	yes	yes	yes	yes	no
Hide SSID	no	no	no	no	no
View how many users connected	yes (leds and admin panel	yes	yes	no	no
Real-time view of downloads/streams	yes	yes	yes	no	no
	LightStream	**ConnectBox-P**	**ConnectBox-S**	**MicroPi**	**BibleBox**
Content					
Autoload from Scriptureearth.org	no	no	no	yes	no
Autoload from Gospel Recordings	no	no	no	yes	no
Autoload from JesusFilm	yes	no	no	no	no
Provide audio to SAB/RAB apps	no	no	no	yes	no
User selects download or play	yes	no (3)	no (3)	yes	no
Download multiple files	yes	no	no	yes (as zip file)	no
Password protected media	yes	no	no	no	no
Use with Sendit/Xender	yes	yes	yes	yes	yes

	LightStream	ConnectBox-P	ConnectBox-S	MicroPi	BibleBox
Support					
Development	active	active	active	active	inactive
Ship to non-US address	no	yes	yes	yes via Amazon	yes via Amazon
Support Website	https://renewoutreach.org/equipment/lightstream-wifi-hotspot/	https://connectbox.technology/wp/	https://connectbox.technology/wp/	https://sites.google.com/sil.org/micropi/home	https://biblebox.org
Approximate Price	$82.00	$70.00	$60.00	$40.00	$60.00

(1) = use with an external battery is a possibility
(2) = depending on the size case you purchase
(3) = user has to right click and choose to download from a context menu
(4) = requires special formatting
(5) = can be adjusted
(6) = can be custom branded

Conclusion

There are now several affordable options for distributing digital content via a closed Wi-Fi network. Each one is backed by developers who want to make it easy for people to access and download Scripture and Scripture-related media on their phones and computers. These developers are responsive to user questions and user input because they want to continue to make their product better and easier to use. Except for the BibleBox Pi, there are more improvements planned for each one in the future.

I hope this guide will help you to choose the one which best fits your needs.

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