

Roku

Roku (/ˈroʊkuː/ *ROH-koo*) is a brand of hardware digital media players manufactured by American company Roku, Inc. They offer access to streaming media content from various online services.

The first Roku model, developed in collaboration with Netflix, was introduced in May 2008. Roku devices have been considered influential on the digital media player market, helping to popularize the concept of low-cost, small-form-factor set-top boxes for over-the-top media consumption.^[1]

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Roku

Developer	Roku, Inc.
Type	Digital media player
Release date	May 20, 2008
Operating system	Roku OS
Website	www.roku.com/products (http://www.roku.com/products)

History

Roku was founded by Anthony Wood in 2002, who had previously founded ReplayTV, a DVR company that competed with Tivo.^[2] After ReplayTV's failure, Wood worked for a while at Netflix. In 2007, Wood's company began working with Netflix on Project:Griffin, a set-top box to allow Netflix users to stream Netflix content to their TVs.^[2] Only a few weeks before the project's launch, Netflix's founder Reed Hastings decided it would hamper license arrangements with third parties, potentially keeping Netflix off other similar platforms, and killed the project.^[3] *Fast Company* magazine cited the decision to kill the project as "one of Netflix's riskiest moves".^[3]

Netflix decided instead to spin off the company, and Roku released their first set-top box in 2008.^[4] In 2010 they began offering models with various capabilities, which eventually became their standard business model.^[4] In 2014, Roku partnered with smart TV manufacturers to produce RokuTVs with built-in Roku functionality.^[2] In 2015, Roku won the inaugural Emmy for Television Enhancement Devices.

Roku streaming players

First generation

The first Roku model, the Roku DVP N1000, was unveiled on May 20, 2008. It was developed in partnership with Netflix to serve as a standalone set-top box for its recently introduced "Watch Instantly" service. The goal was to produce a device with small footprint that could be sold at low cost compared to larger digital video recorders and video game consoles. It featured an NXP PNX8935 video decoder supporting both standard and high definition formats up to 720p; HDMI output; and automatic software updates, including the addition of new channels for other video services.^{[5][1][6]}

Roku launched two new models in October 2009: the Roku SD (a simplified version of the DVP, with only analog AV outputs); and the Roku HD-XR, an updated version with 802.11n Wi-Fi and a USB port for future functionality. The Roku DVP was retroactively renamed the Roku HD. By then, Roku had added support for other services, such as Amazon Video



Original form factor XD/S

and [MLB.tv](#). The next month, they introduced the Channel Store, where users could download third-party apps for other content services (including the possibility of private services for specific uses).^{[7][8]}

Netflix support was initially dependent on a PC, requiring users to add content to their "Instant Queue" from the service's web interface before it could be accessed via the Roku. In May 2010, the channel was updated to allow users to search the Netflix library directly from the device.^[9]

In August 2010, Roku announced plans to add [1080p](#) video support to the HD-XR.^[10] The next month, they released an updated lineup with thinner form factors: a new HD; the XD, with 1080p support; and the XDS, with optical audio, dual-band Wi-Fi, and a USB port. The XD and XDS also included an updated remote.^[11]

Support for the first-generation Roku models ended in September 2015.^[12]

Second generation

In July 2011, Roku unveiled its second generation of players, branded as Roku 2 HD, XD, and XS. All three models included 802.11n, and also added [microSD](#) slots and [Bluetooth](#). The XD and XS supported 1080p, and only the XS model included an Ethernet connector and USB port. They also supported the "Roku Game Remote"—a Bluetooth remote with [motion controller](#) support for games, which was bundled with the XS and sold separately for other models.^[13] The Roku LT was unveiled in October, as an entry-level model with no Bluetooth or microSD support.^[14]



A Roku 2 XS

In January 2012, Roku unveiled the Streaming Stick - a new model condensed into a [dongle](#) form factor using [Mobile High-Definition Link](#) (MHL).^{[15][16]} Later in October, Roku introduced a new search feature to the second-generation models, aggregating content from services usable on the device.^[17]

Third generation

Roku unveiled its third-generation models in March 2013, the Roku 3 and Roku 2. The Roku 3 contained an upgraded CPU over the 2 XS, and a [Wi-Fi Direct](#) remote with an integrated headphone jack. The Roku 2 was also updated with a faster CPU.^{[18][19]}

Fourth generation

In October 2015, Roku introduced the Roku 4; the device contained upgraded hardware with support for [4K resolution](#) video, as well as [802.11ac](#) wireless.^[20]

Fifth generation

Roku revamped their entire streaming player line-up with five new models in September 2016 (low end Roku Express, Roku Express+, high end Roku Premiere, Roku Premiere+, and top-of-the-line Roku Ultra), while the Streaming Stick (3600) was held over from the previous generation (having been released the previous April) as a sixth option.^[21] The Roku Premiere+ and Roku Ultra support [HDR video](#) using HDR10.^[22]

Sixth generation

In October 2017, Roku introduced its sixth generation of products. The updates included the discontinuation of the Premiere and Premiere+ models, the introduction of the Streaming Stick+ (with an enhanced Wi-Fi antenna device), as well as new processors for the Roku Streaming Stick, Roku Express, and Roku Express+.^[23]

Seventh generation

In September 2018, Roku introduced the seventh generation of products. Carrying over from the 2017 sixth-generation without any changes are the Express (3900), Express+ (3910), Streaming Stick (3800), and Streaming Stick+ (3810). The Ultra is the same hardware device from 2017, but it comes with JBL premium headphones and is repackaged with the new model number 4661. Roku has resurrected the Premiere and Premiere+ names, but these two new models bear little resemblance to the 2016 fifth-generation Premiere (4620) and Premiere+ (4630) models. The new Premiere (3920) and Premiere+ (3921) are essentially based on the Express (3900) model with 4K support added, it also includes Roku Streaming Stick+ Headphone Edition (3811) for improving Wifi signal strength and private listening.

Eighth generation

In September 2019, Roku introduced the eighth generation of products.^[24]

The same year, [Netflix](#) decided not to support older generations of Roku, including the Roku HD, HD-XR, SD, XD, and XDS, as well as the NetGear-branded XD and XDS. Roku had warned in 2015 that it would stop updating players made in May 2011 or earlier, and these vintage boxes were among them.^[25]

Ninth generation

On September 28, 2020, Roku introduced the ninth generation of products.^[26] An updated Roku Ultra was released along with the addition of the Roku Streambar, a 2-in-1 Roku and Soundbar device. The microSD slot was removed from the new Ultra 4800, making it the first top-tier Roku device since the first generation to lack this feature.

Feature comparison

Model	Introduced	Video outputs		Video resolutions			Audio output		Network		USB	Remote
		Composite, S-Video	Component, HDMI	480i, 480p	720p, 1080p (HD)	2160p (4K)	Analog	Optical, HDMI	Ethernet	802.11 wireless		
First generation												
Roku DVP (N1000)	May 2008	Both	Both	Both	720p	No	Yes	Both	Yes	b/g	No	IR
Roku SD (N1050)	Oct 2009	Composite	Neither	480i	Neither	No	Yes	Neither	Yes	b/g	No	IR
Roku HD (N1100)	Nov 2009	Both	Both	Both	720p	No	Yes	Both	Yes	b/g	No	IR
Roku HD-XR (N1101)	Oct 2009	Both	Both	Both	Both ^[note 2]	No	Yes	Both	Yes	a/b/g/n dual-band	Yes	IR
Roku HD (2000)	Sep 2010	Composite	HDMI	Both	720p	No	Yes	HDMI	Yes	b/g	No	IR
Roku XD (2050)	Sep 2010	Composite	HDMI	Both	Both ^[note 2]	No	Yes	HDMI	Yes	b/g/n	No	IR
Roku XDS (2100)	Sep 2010	Composite	Both ^[note 3]	Both	Both ^[note 2]	No	Yes	Both	Yes	a/b/g/n dual-band	Yes	IR
Second generation												
Model	Introduced	Video outputs		Video resolutions			Audio output		Network		USB	Remote
		Composite, S-Video	Component, HDMI	480i, 480p	720p, 1080p (HD)	2160p (4K)	Analog	Optical, HDMI	Ethernet	802.11 wireless		
Roku LT (2400)	Nov 2011	Composite	HDMI	Both	720p	No	Yes	HDMI	No	b/g/n	No	IR
Roku LT (2450)	Apr 2012	Composite	HDMI	Both	720p	No	Yes	HDMI	No	b/g/n	No	IR
Roku HD (2500)	Apr 2012	Composite	HDMI	Both	720p	No	Yes	HDMI	No	b/g/n	No	IR
Roku 2 HD (3000)	Jul 2011	Composite	HDMI	Both	720p	No	Yes	HDMI	No	b/g/n	No	IR ^[note 4]
Roku 2 XD (3050)	Jul 2011	Composite	HDMI	Both	Both ^[note 5]	No	Yes	HDMI	No	b/g/n	No	IR ^[note 4]
Roku 2 XS (3100)	Jul 2011	Composite	HDMI	Both	Both ^[note 5]	No	Yes	HDMI	Yes	b/g/n	Yes	IR, Bluetooth
Roku Streaming Stick, MHL (3400, 3420)	Oct 2012	Neither	MHL only	480p	Both ^[note 6]	No	No	HDMI	No	b/g/n dual-band ^[39]	No	Wi-Fi Direct
Roku Streaming Stick, HDMI (3500)	Mar 2014 ^[41]	Neither	HDMI	Neither	Both	No	No	HDMI	No	a/b/g/n dual-band	No	Wi-Fi Direct
Third generation												
Model	Introduced	Video outputs		Video resolutions			Audio output		Network		USB	Remote
		Composite, S-Video	Component, HDMI	480i, 480p	720p, 1080p (HD)	2160p (4K)	Analog	Optical, HDMI	Ethernet	802.11 wireless		
Roku LT (2700)	Sep 2013	Composite	HDMI	Both	720p	No	Yes	HDMI	No	b/g/n	No	IR
Roku 1, SE (2710)	Sep 2013	Composite	HDMI	Both	Both	No	Yes	HDMI	No	b/g/n	No	IR
Roku 2 (2720)	Sep 2013	Composite	HDMI	Both	Both	No	Yes & Remote	HDMI	No	a/b/g/n dual-band	No	IR, Wi-Fi Direct
Roku 3 (4200)	Mar 2013	Neither	HDMI	Neither	Both	No	Remote ^[note 7]	HDMI	Yes	a/b/g/n dual-band	Yes	IR, Wi-Fi Direct
Roku 2 (4210)	Apr 2015	Neither	HDMI	Neither	Both	No	No	HDMI	Yes	a/b/g/n dual-band	Yes	IR ^[note 8]
Roku 3 (4230)	Apr 2015	Neither	HDMI	Neither	Both	No	Remote ^[note 7]	HDMI	Yes	a/b/g/n dual-band	Yes	IR, Wi-Fi Direct, Voice Search
Fourth generation												
Model	Introduced	Video outputs		Video resolutions			Audio output		Network		USB	Remote

		Composite, S-Video	Component, HDMI	480i, 480p	720p, 1080p (HD)	2160p (4K)	Analog	Optical, HDMI	Ethernet	802.11 wireless		
Roku Streaming Stick (3600) ^[43]	Apr 2016	Neither	HDMI	Neither	Both	No	Stream to smartphone	HDMI	No	a/b/g/n dual-band	No	Wi-Fi Direct
Roku 4 (4400) ^[46]	Oct 2015	Neither	HDMI	Neither	Both	Yes	Remote ^[note 7]	Optical & HDMI	Yes, 10/100 Mbps	a/b/g/n/ac dual-band	Yes	IR, Wi-Fi Direct, Voice Search
<i>Fifth generation</i>												
Model	Introduced	Video outputs		Video resolutions			Audio output		Network		USB	Remote
		Composite, S-Video	Component, HDMI	480i, 480p	720p60, 1080p60 (HD)	2160p60 (4K)	Analog	Optical, HDMI	Ethernet	802.11 wireless		
Roku Express (3700)	Oct 2016	Neither	HDMI	Neither	Both	No	Stream to smartphone	HDMI	No	b/g/n	No	IR
Roku Express+ (3710)	Oct 2016	Composite	HDMI	480i	Both	No	Yes & Stream to smartphone	HDMI	No	b/g/n	No	IR
Roku Premiere (4620)	Oct 2016	Neither	HDMI	Neither	Both	Yes	Stream to smartphone	HDMI	No	a/b/g/n/ac dual-band	No	IR
Roku Premiere+ (4630)	Oct 2016	Neither	HDMI	Neither	Both	Yes	Remote ^[note 7] & Stream to smartphone	HDMI	Yes, 10/100 Mbps	a/b/g/n/ac dual-band	No	IR, Wi-Fi Direct
Roku Ultra (4640)	Oct 2016	Neither	HDMI	Neither	Both	Yes	Remote ^[note 7] & Stream to smartphone	Optical & HDMI	Yes, 10/100 Mbps	a/b/g/n/ac dual-band	Yes	IR, Wi-Fi Direct, Voice Search
<i>Sixth generation</i>												
Model	Introduced	Video outputs		Video resolutions			HDR format	Audio output		Network		USB
		Composite, S-Video	Component, HDMI	480i, 480p	720p60, 1080p60 (HD)	2160p60 (4K)	HDR10/Dolby Vision	Analog	Optical, HDMI	Ethernet	802.11 wireless	
Roku Express (3900) ^[50]	Oct 2017	Neither	HDMI	Neither	Both	No	No	Stream to smartphone	HDMI	No	b/g/n	No
Roku Express+ (3910) ^[51]	Oct 2017	Composite	HDMI	480i	Both	No	No	Yes & Stream to smartphone	HDMI	No	b/g/n	No
Roku Streaming Stick (3800) ^[52]	Oct 2017	Neither	HDMI	Neither	Both	No	No	Stream to smartphone	HDMI	No	a/b/g/n/ac dual-band	No
Roku Streaming Stick+ (3810) ^[53]	Oct 2017	Neither	HDMI	Neither	Both	Yes	HDR10	Stream to smartphone	HDMI	No	a/b/g/n/ac dual-band	No
Roku Ultra (4660) ^[54]	Oct 2017	Neither	HDMI	Neither	Both	Yes	HDR10	Remote ^[note 7] & Stream to smartphone	HDMI	Yes, 10/100 Mbps	a/b/g/n/ac dual-band	Yes
<i>Seventh generation</i>												
Model	Introduced	Video outputs		Video resolutions			HDR format	Audio output				Ne
		Composite, S-Video	Component, HDMI	480i, 480p	720p60, 1080p60 (HD)	2160p60 (4K)	HDR10/Dolby Vision	Analog	Optical, HDMI	DTS	Dolby Atmos	
Roku Premiere (3920)	Sep 2018	Neither	HDMI	Neither	Both	Yes	HDR10	Stream to smartphone	HDMI	Yes	Yes	No
Roku Premiere+ (3921)	Sep 2018	Neither	HDMI	Neither	Both	Yes	HDR10	Stream to smartphone	HDMI	Yes	Yes	No
Roku Ultra (4661)	Sep 2018	Neither	HDMI	Neither	Both	Yes	HDR10	Remote ^[note 7] & Stream to smartphone	HDMI	Yes	Yes	Yes, 10/100 Mbps
<i>Eighth generation</i>												
Model	Introduced	Video outputs		Video resolutions			HDR format	Audio output				Ne
		Composite, S-Video	Component, HDMI	480i, 480p	720p60, 1080p60 (HD)	2160p60 (4K)	HDR10/Dolby Vision	Analog	Optical, HDMI	DTS	Dolby Atmos	
Roku Streaming	Sep 2019	Neither	HDMI	Neither	Both	Yes	HDR10	Stream to smartphone	HDMI 2.0a	Yes	Yes	No

Stick+ (3810)												
Roku Express (3930)	Sep 2019	Neither	HDMI	Neither	Both	No	No	Stream to smartphone	HDMI 1.4b	Yes	Yes	No
Roku Express+ (3931)	Sep 2019	Neither	HDMI	Neither	Both	No	No	Stream to smartphone	HDMI 1.4b	Yes	Yes	No
Roku Premiere (3920)	Sep 2019	Neither	HDMI	Neither	Both	Yes	HDR10	Stream to smartphone	HDMI 2.0a	Yes	Yes	No
Roku Ultra LT (4662)	Sep 2019	Neither	HDMI	Neither	Both	Yes	HDR10	Remote & Stream to smartphone	HDMI 2.0a	Yes	Yes	Yes
Roku Ultra (4670)	Sep 2019	Neither	HDMI	Neither	Both	Yes	HDR10	Remote & Stream to smartphone	HDMI 2.0a	Yes	Yes	Yes
<i>Ninth generation</i>												
Model	Introduced	Video outputs		Video resolutions			HDR format	Audio output				Ne
		Composite, S-Video	Component, HDMI	480i, 480p	720p60, 1080p60 (HD)	2160p60 (4K)	HDR10/Dolby Vision/HLG	Analog	Optical, HDMI	DTS	Dolby Atmos	
Roku Ultra (4800)	Oct 2020	Neither	HDMI	Neither	Both	Yes	All	Remote & Stream to smartphone	HDMI 2.0b	Yes	Yes	Yes
Roku Streambar (9102R)	Oct 2020	Neither	HDMI	Neither	Both	Yes	HDR10, HLG	Remote & Stream to smartphone	Optical, HDMI 2.0a	Yes	Yes	No

Roku TV

Roku announced its first branded Smart TV and it was released in late 2014. These TVs are manufactured by companies like TCL, Westinghouse and Hisense, and use the Roku user interface as the "brain" of the TV. Roku TVs are updated just like the streaming devices.^[56] More recent models also integrate a set of features for use with over-the-air TV signals, including a program guide that provides information for shows and movies available on local antenna broadcast TV, as well as where that content is available to stream, and the ability to pause live TV (although the feature requires a USB hard drive with at least 16GB storage).

In January 2020, Roku created a badge to certify devices as working with a Roku TV model. The first certified brands were TCL North America, Sound United, Polk Audio, Marantz, Definitive Technology, and Classé.

In January 2021, a Roku executive said one out of three smart TVs sold in the United States and Canada came with Roku's operating system built-in.^[57]

Software

The Roku box runs a custom [Linux](#) distribution called Roku OS. Updates to the software include bug fixes, security updates, feature additions, and many new interface revisions. Roku pushes OS updates to supported devices in a staggered release. OS updates are rolled out to a percentage group of candidate devices to ensure the [build](#) is stable before being made available en masse.

Content and programming

Roku provides video services from a number of [Internet](#)-based [video on demand](#) providers.

Roku channels

Content on Roku devices is provided by Roku partners and are identified using the term *channel*. Users can add or remove different channels using the Roku Channel Store. Roku's website does not specify which channels are free to its users.

Service creation for Roku Player

The Roku is an open-platform device with a freely available [software development kit](#) that enables anyone to create new channels.^[58] The channels are written in a Roku-specific language called BrightScript, a scripting language the company describes as 'unique', but "similar to [Visual Basic](#)" and "similar to [JavaScript](#)".^[59]

Developers who wish to test their channels before a general release, or who wish to limit viewership, can create "private" channels that require a code be entered by the user in the account page of the Roku website. These private channels, which are not part of the official Roku Channel Store, are neither reviewed or certified by Roku.^{[60][61]}

There is an NDK (Native Developer Kit) available, though it has added restrictions.^[59]

The Roku Channel

Roku launched its own streaming channel on its devices in October 2017. It is ad-supported, but free. Its licensed content includes movies and TV shows from studios such as Lionsgate, MGM, Paramount, Sony Pictures Entertainment, Warner Bros., and Disney as well as Roku channel content publishers American Classics, FilmRise, Nosey, OVGuide, Popcornflix, Vidmark, and YuYu. It is implementing an ad revenue sharing model with content providers. On August 8, 2018, The Roku Channel became available on the web as well.^[62] Roku also added the "Featured Free" section as the top section of its main menu from which users can get access to direct streaming of shows and movies from its partners.^[63]

In January 2019, premium subscription options from select content providers were added to The Roku Channel.

Originally only available in the U.S.,^[64] it launched in the UK on April 7, 2020, with a different selection of movies and TV shows, and without premium subscription add-ons.^[65]

On January 8, 2021, Roku announced the purchase of video streaming company Quibi and will stream 75 new shows.^[66]

It was not disclosed how much Roku paid for Quibi, but Wall Street Journal reports it is much less than \$100 million.^{[67][68]}

Advertising

Roku also earns revenue from video ads that it sells on ad-supported Roku channels.^[69] The company typically takes 30 percent of a streaming service's ad inventory on Roku,^[70] but it maintains full control of ad inventory on The Roku Channel.^[71]

Controversies

Non-certified channels

The Daily Beast alleged that non-certified channels on Roku eased access to materials promoting conspiracy theories and terrorism content.^[72]

In June 2017, a Mexico City court banned the sale of Roku products in Mexico, following claims by Televisa (via its Izzi cable subsidiary), that the devices were being used for subscription-based streaming services that illegally stream television content without permission from copyright holders. The devices used Roku's private channels feature to install the services, which were all against the terms of service Roku applies for official channels available in its store. Roku defended itself against the allegations as such, stating that these channels were not officially certified and that the company takes active measures to stop illegal streaming services.^[73] The 11th Collegiate Court in Mexico City overturned the decision in October 2018, with Roku returning to the Mexican market soon after; Televisa's streaming service Blim TV would also launch on the platform.^[74]

In August 2017 Roku began to display a prominent disclaimer when non-certified channels are added, warning that channels enabling piracy may be removed "without prior notice".^{[75][61][76]} In mid-May 2018, a software glitch caused some users to see copyright takedown notices on legitimate services such as Netflix and YouTube. Roku acknowledged and patched the glitch.^{[77][78]}

Carriage disputes

Pay television-styled carriage disputes emerged on the Roku platform in 2020, as the company requires providers to agree to revenue sharing for subscription revenue on services that are billed through the platform, and 30% of advertising inventory.^[79] On September 18, 2020, Roku announced that NBCUniversal TV Everywhere services would be removed from its devices "as early as this weekend", due to its refusal to carry the company's streaming service Peacock under terms it deemed "unreasonable".^[79] It reached an agreement with NBCUniversal later that day.^[80] HBO Max was unavailable on Roku since its launch until December 2020 due to similar disputes over revenue sharing, particularly in regards to an upcoming ad-supported service.^{[81][82]} On December 17, 2020, HBO Max began streaming on Roku.^[83]

See also

- Comparison of set-top boxes
- SoundBridge, another Roku product
- Smart TV

Notes

- In the first generation players, the size of flash memory limited the number of channels that could be installed. Later models (>2100) removed that limit.
- 1080p at p24 or p30 only.
- The component video connector on the Roku XDS (2100X) is a nonstandard 3.5mm connector and a proprietary adapter cable, which is sold separately, is effectively required to use this.^[33]
- Bluetooth remote optional.
- 1080p at p60 only.
- 1080p at p24.
- Analog audio output is available only through the headphone jack on the remote.
- WiFi Direct Remote optional.

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- Official website (http://www.roku.com/)
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