

CONNECTING YOUR COMPUTER TO A TV: HDMI, "wireless HDMI," "WiDi," "EZCast," and "Chromecast"



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SUMMARY

By using HDMI, "wireless HDMI", "WiDi", "Chromecast", "EZCast", or or a "ScreenBeam Kit", you can connect your computer to a television (or to a monitor that has an HDMI jack)

TOPICS

- Wired connections for connecting a computer to a TV or a monitor
- Terminology for wireless connections between a computer and a TV or a monitor
- Time Line of Wireless Computer-to-TV Technology
- Comparison of Wireless Computer-to-TV Technologies

TOPICS

- "Wireless HDMI"
- "WiDi"
- "EZCast 5G"
- "Chromecast"
- Actiontec's "ScreenBeam" "Transmitter and Receiver Kit"

WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- Three types of connections from a computer to a monitor or TV:

VGA

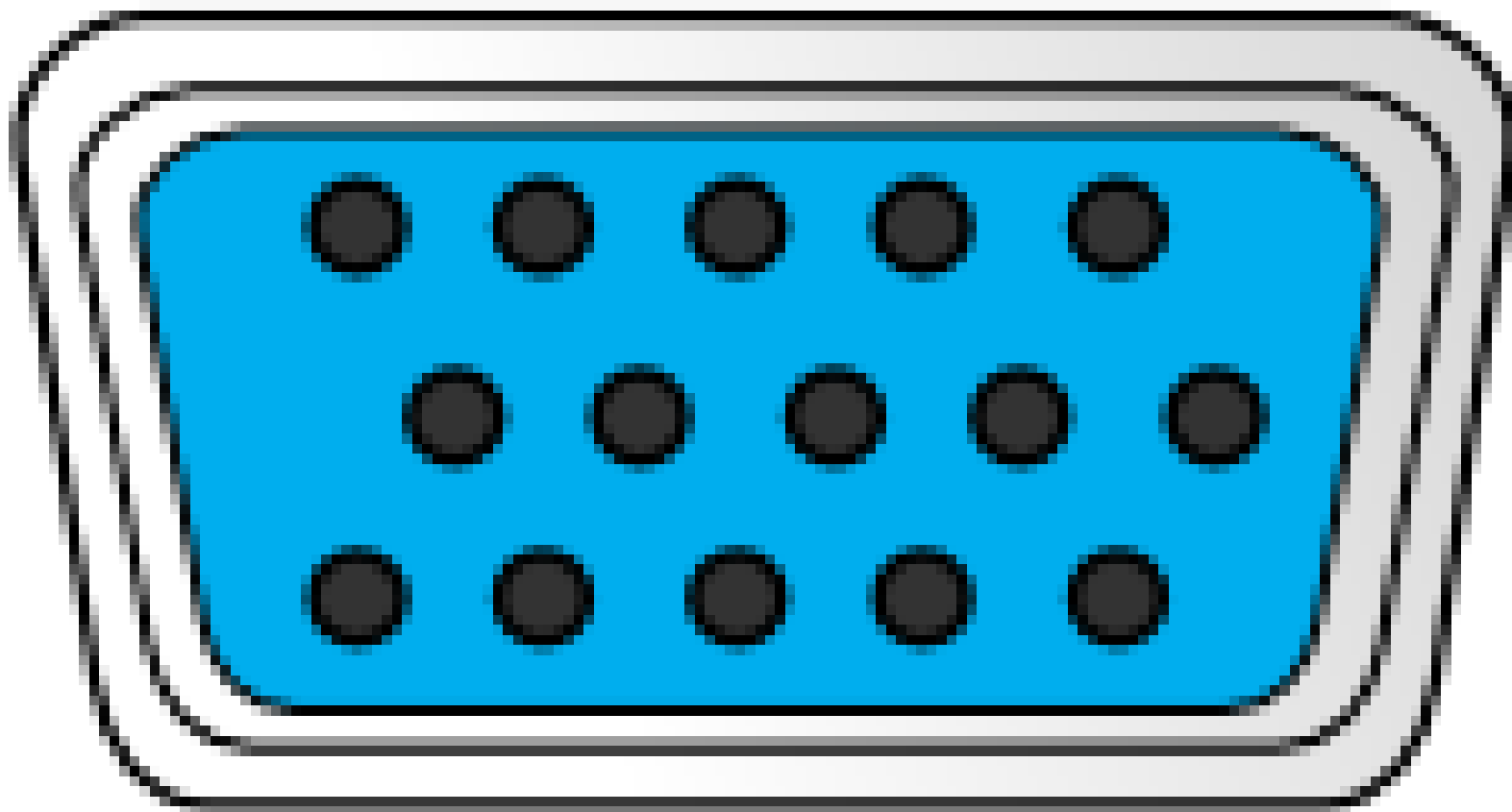
DVI

HDMI

WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- "VGA" stands for "Video Graphics Array"
- A "VGA" port is sometimes called a "PC" port in a TV





Computer

VGA port

VGA cable



TV
or
Monitor

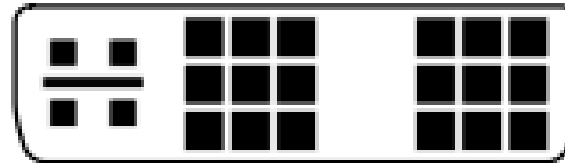
VGA port
(= "PC" port)

No is sound transmitted to the TV or monitor.

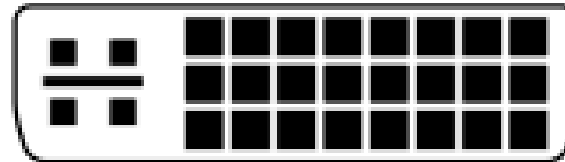
WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- "DVI" stands for "Digital Visual Interface"

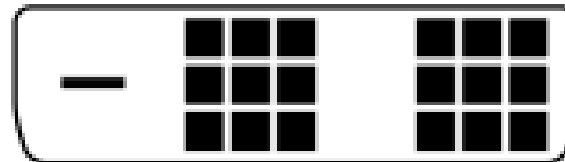




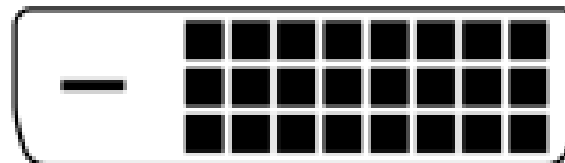
DVI-I (Single Link)



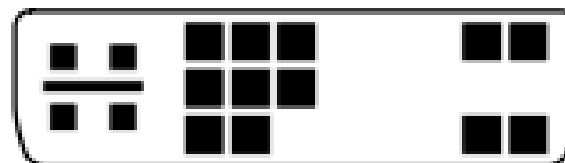
DVI-I (Dual Link)



DVI-D (Single Link)



DVI-D (Dual Link)



DVI-A

WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- A DVI cable will transmit the video screen from the computer to the TV or monitor
- A DVI cable will not transmit the sound from the computer to the TV or monitor

Computer

DVI port

DVI cable



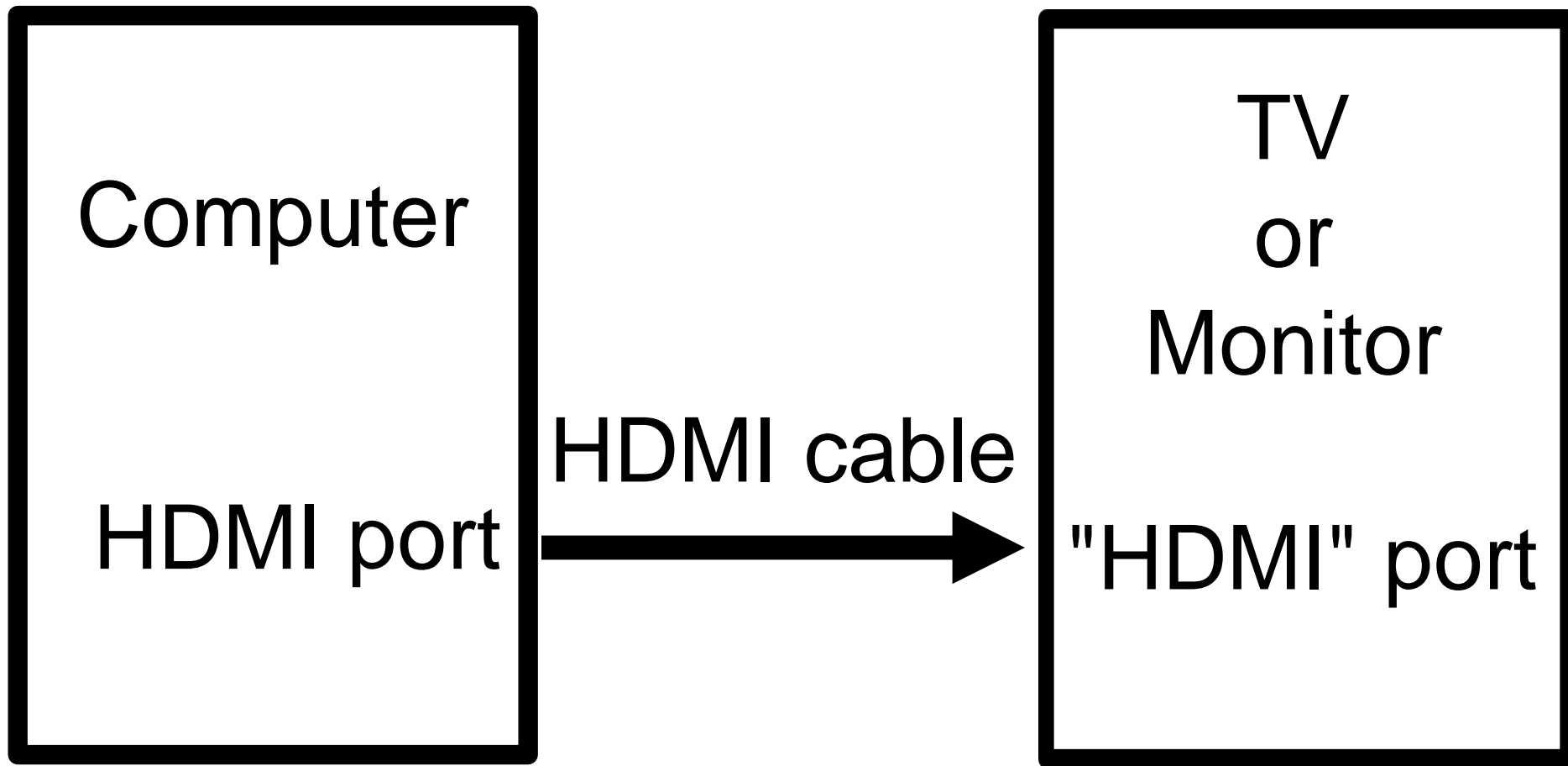
TV
or
Monitor

DVI port

No is sound transmitted to the TV or monitor.

WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- "HDMI" stands for "High Definition Multimedia Interface"
- A HDMI cable carries both the video signal and the sound from the computer to the TV or monitor

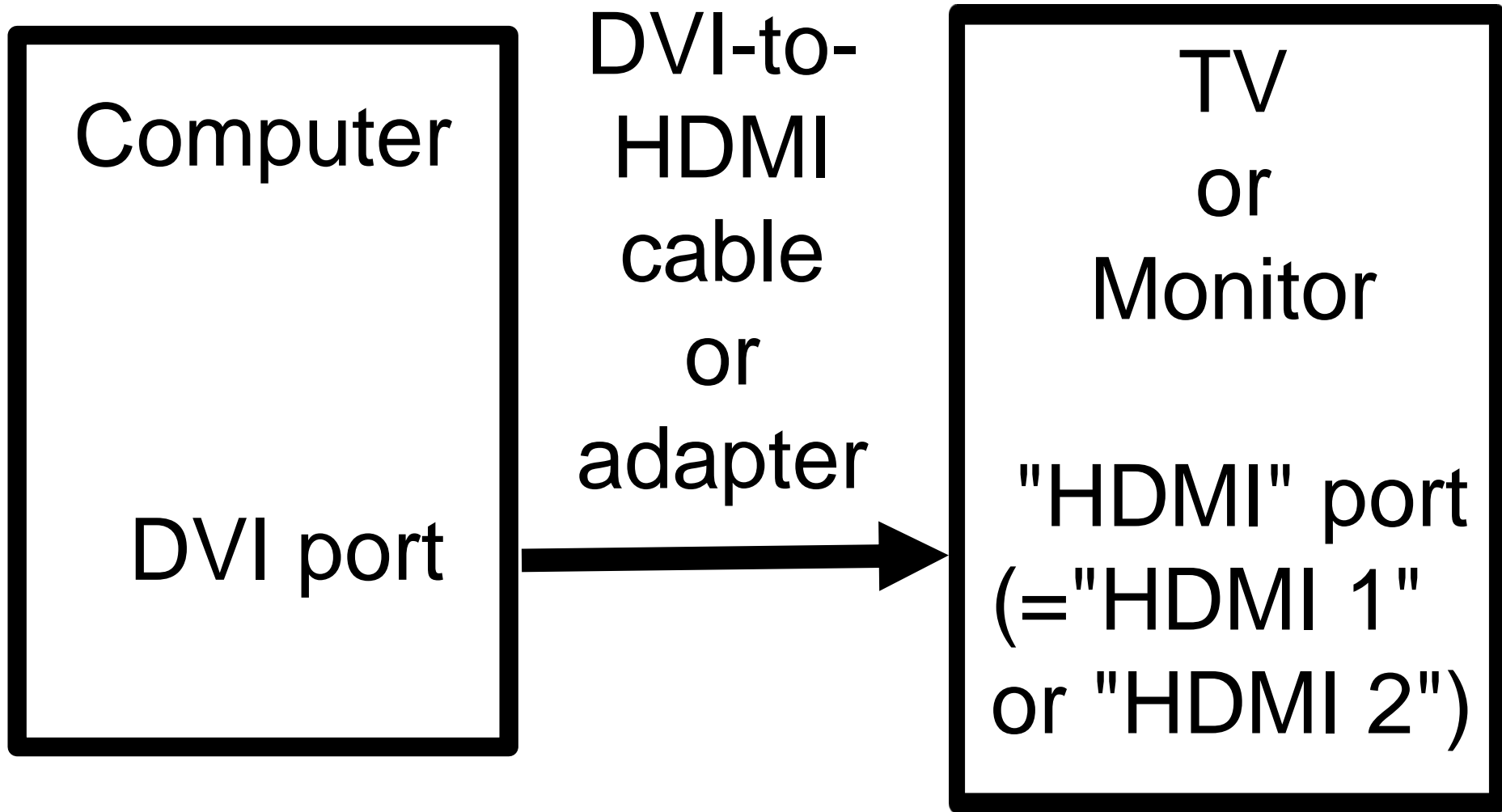


Sound is transmitted to the TV or monitor.

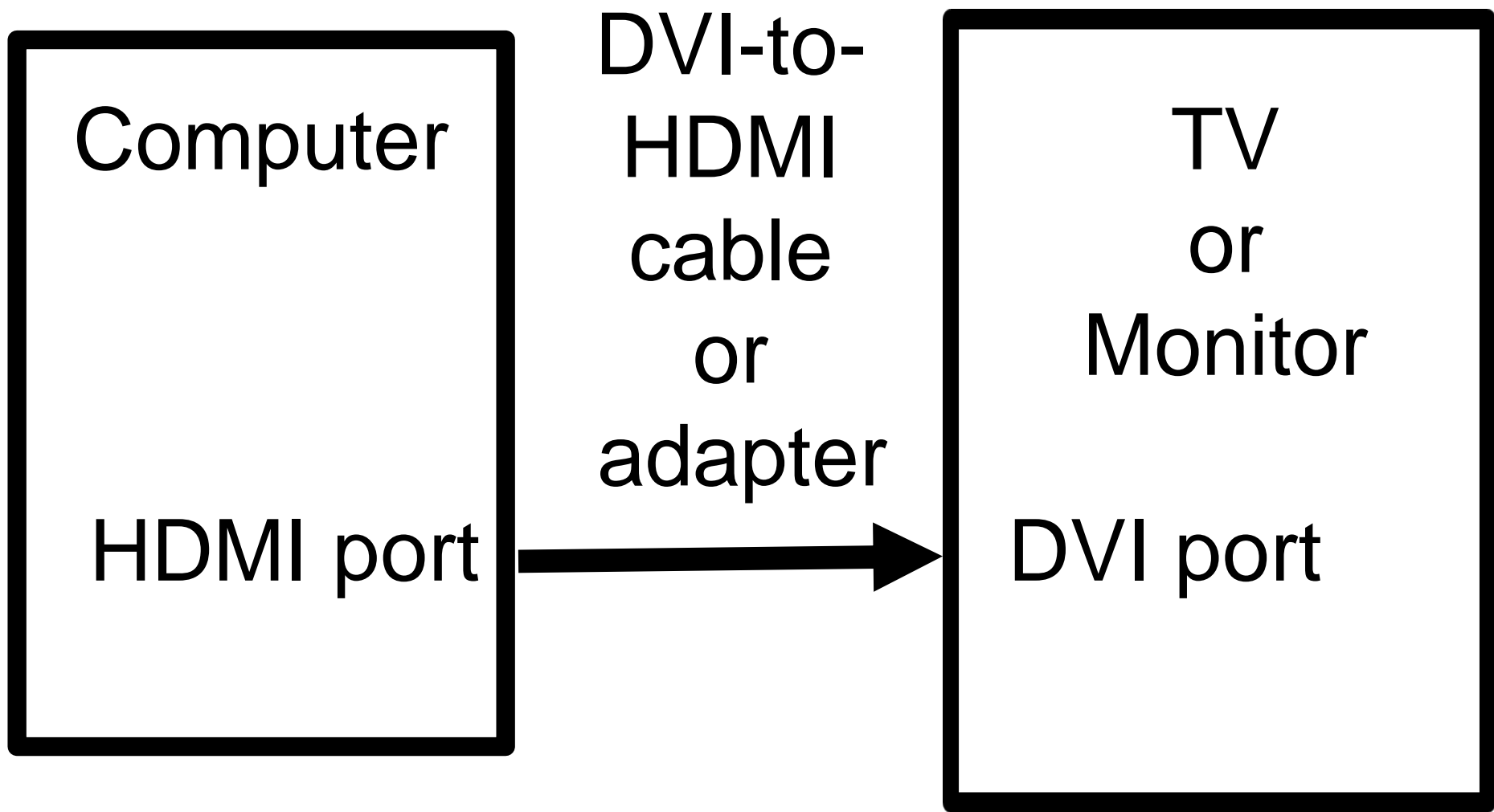
WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- A conversion between HDMI and DVI is easy:
You use a conversion cable or a conversion adapter.
Both are passive devices.
No active electronics is needed to make the conversion.





No sound is transmitted to the TV or monitor.



No sound is transmitted to the TV or monitor.

WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- If you have a DVI port at one end and a HDMI port at the other end, you will not transmit the sound.

WIRED CONNECTIONS FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- VGA, DVI, and HDMI cables have maximum usable length of between 15 and 22 feet.

TERMINOLOGY FOR WIRELESS CONNECTIONS BETWEEN A COMPUTER AND A TV OR A MONITOR

- "Streaming stick"
- "Dongle"
- "SSID"

TERMINOLOGY FOR WIRELESS CONNECTIONS BETWEEN A COMPUTER AND A TV OR A MONITOR

- "streaming stick" =
A device that you plug into the HDMI port of a television set or a flatscreen monitor

TERMINOLOGY FOR WIRELESS CONNECTIONS BETWEEN A COMPUTER AND A TV OR A MONITOR

- According to [http://en.wikipedia.org/wiki/Dongle:](http://en.wikipedia.org/wiki/Dongle)
" A **dongle** is a small piece of hardware that attaches to a computer, TV, or other electronic device in order to enable additional functions.."

TERMINOLOGY FOR WIRELESS CONNECTIONS BETWEEN A COMPUTER AND A TV OR A MONITOR

- "**SSID**" stands for "Service Set Identifier:"
A "**SSID**" is broadcast by a "Wireless Access Point" which is usually part of a "wireless router"

TIMELINE OF WIRELESS COMPUTER-TO-TV TECHNOLOGIES

- **2007:** "wireless HDMI"
- **2010-01:** "WiDi" = "Intel Wireless Display"
- **2013-01:** Actiontec "ScreenBeam Kit"
- **2013-07:** "Chromecast"
- **2013-11:** "EZCast"
- **2015-06:** "EZCast 5G"

COMPARISON OF THE WIRELESS COMPUTER-TO-TV TECHNOLOGIES

- Price comparison?
- Main feature comparison?
- Usable for the only monitor or the main monitor of a computer?
- Technical complexity index?



PRICE COMPARISON OF THE WIRELESS COMPUTER-TO-TV TECHNOLOGIES

- 2007: **"wireless HDMI"** (~\$250)
- 2010-01: **"WiDi"** = "Intel Wireless Display" (~\$200)
- 2013-01: Actiontec **"ScreenBeam Kit"** (~\$80)
- 2013-07: **"Chromecast"** (~\$40)
- 2015-06: **"EZCast 5G"** (~\$40+, no USB Power Supply)



PRICE COMPARISON OF THE WIRELESS COMPUTER-TO-TV TECHNOLOGIES

- Main feature comparison:

- 2007: **"wireless HDMI"** (simplest to install and use)
- 2010-01: **"WiDi"** (best penetration through walls)
- 2013-01: Actiontec **"ScreenBeam Kit"**
- 2013-07: **"Chromecast"** (easy to use in a home environment, complex to use in public Wi-Fi environment, need to bring along your own wireless router)
- 2015-06: **"EZCast 5G"** (easier to use in a public Wi-Fi environment)

PRICE COMPARISON OF THE WIRELESS COMPUTER-TO-TV TECHNOLOGIES

- Usable for the only monitor or the main monitor of your computer?

- 2007: **"wireless HDMI"** (can be used as the only monitor of your computer)
- 2010-01: **"WiDi"** (cannot be used as the only monitor of your computer)
- 2013-01: Actiontec **"ScreenBeam Kit"** (cannot be used as the only monitor of your computer)
- 2013-07: **"Chromecast"** (cannot be used as the only monitor of your computer)
- 2015-06: **"EZCast 5G"** (cannot be used as the only monitor of your computer)

PRICE COMPARISON OF THE WIRELESS COMPUTER-TO-TV TECHNOLOGIES

- Effect on existing wireless Wi-Fi network bandwidth for your computer?

- 2007: **"wireless HDMI"** (no effect on wireless network bandwidth)
- 2010-01: **"WiDi"** (reduces wireless network bandwidth since it uses the existing "Intel" wireless Wi-Fi adapter of your computer)

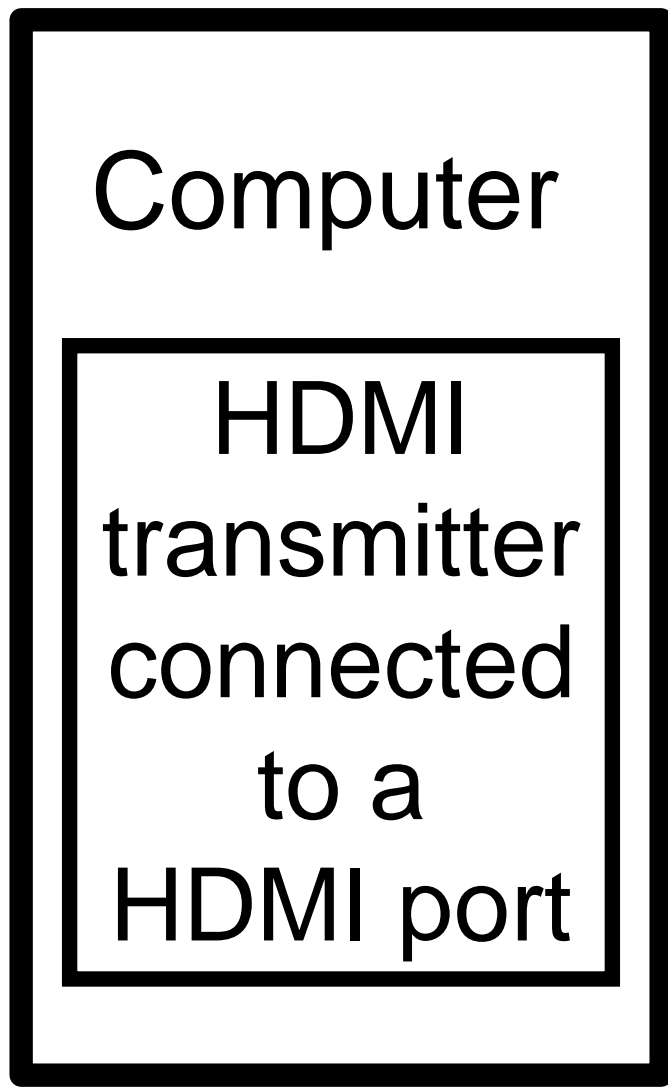
- 2013-01: Actiontec "**ScreenBeam Kit**"
(minimum effect on wireless network bandwidth since a USB Wi-Fi transmitter dedicated to communicating with the TV or (second) monitor is provided for your computer)

- 2013-07: "**Chromecast**" (reduces wireless network bandwidth since it uses the existing wireless Wi-Fi adapter of your computer. The existing wireless Wi-Fi adapter of your computer has to also be the same network adapter that connects your computer to the Internet or "**Chromecast**" software will refuse to install into your computer.)

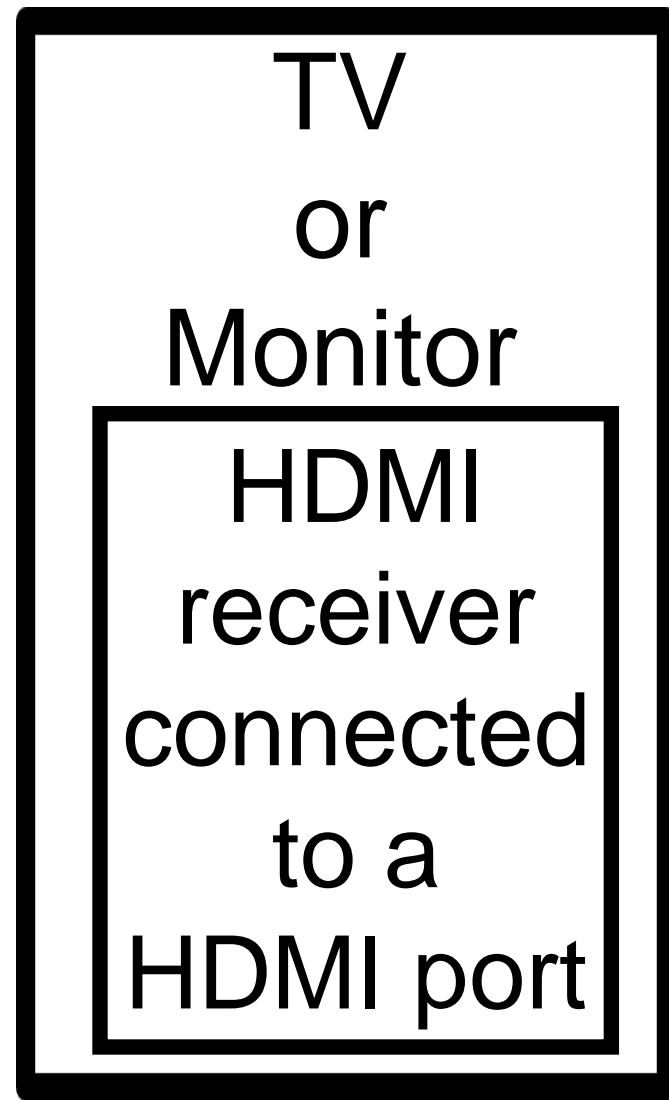
- 2015-06: **"EZCast 5G"** (reduces wireless network bandwidth since it uses the existing wireless Wi-Fi adapter of your computer.)

WIRELESS HDMI

- At the computer end, you install a "HDMI transmitter"
- At the TV or monitor end, you install a "HDMI receiver" that is compatible with the "HDMI transmitter" that you installed at the computer end.



Low-powered 2.4 GHz radio signals extend the HDMI connection



The TV is a second monitor for the computer. Sound is transmitted to the TV.

WIRELESS HDMI

- "Wireless HDMI" is the only wireless "computer-to-tv" technology that automatically works when you turn on your computer.
- All other wireless "computer-to-tv" technologies require that you do something after you turn on your computer.

WIRELESS HDMI

- For detailed information about "wireless HDMI", see [http://aztcs.org/meeting_notes/winhardsi
g/wireless/wireless_HDMI.pdf](http://aztcs.org/meeting_notes/winhardsi
g/wireless/wireless_HDMI.pdf)

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- **"WiDi"**
- **"EZCast"**
- **"Chromecast"**
- **"ScreenBeam Kit"**

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- At the computer end, transmit video and sound is transmitted by a Wi-Fi wireless networking adapter
- At the TV or monitor end, you have 3 types of receiver devices that you can install:

Computer



Wi-Fi
wireless
networking
adapter

Wireless
Wi-Fi
radio
signals



TV or Monitor



**"WiDi" /
"Miracast"
receiver**
or
"EZCast"
or
"Chromecast"
or
**"ScreenBeam
Kit"**

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- At the TV or monitor end, all three of these types of receivers have an integral wireless router inside of them. The integral wireless router provides a real wireless access point with a real SSID for the Wi-Fi wireless networking adapter at the computer end to communicate with.

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- At the computer end, your computer needs to have a wireless Wi-Fi network adapter

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- Three types of Wi-Fi adapters:
 - Integral Wi-Fi adapter (on the motherboard or as a daughterboard attached to the motherboard)
 - PCI or PCIe or "mini PCIe" Wi-Fi adapter
 - USB Wi-Fi adapter

Computer



Wi-Fi wireless
networking adapter



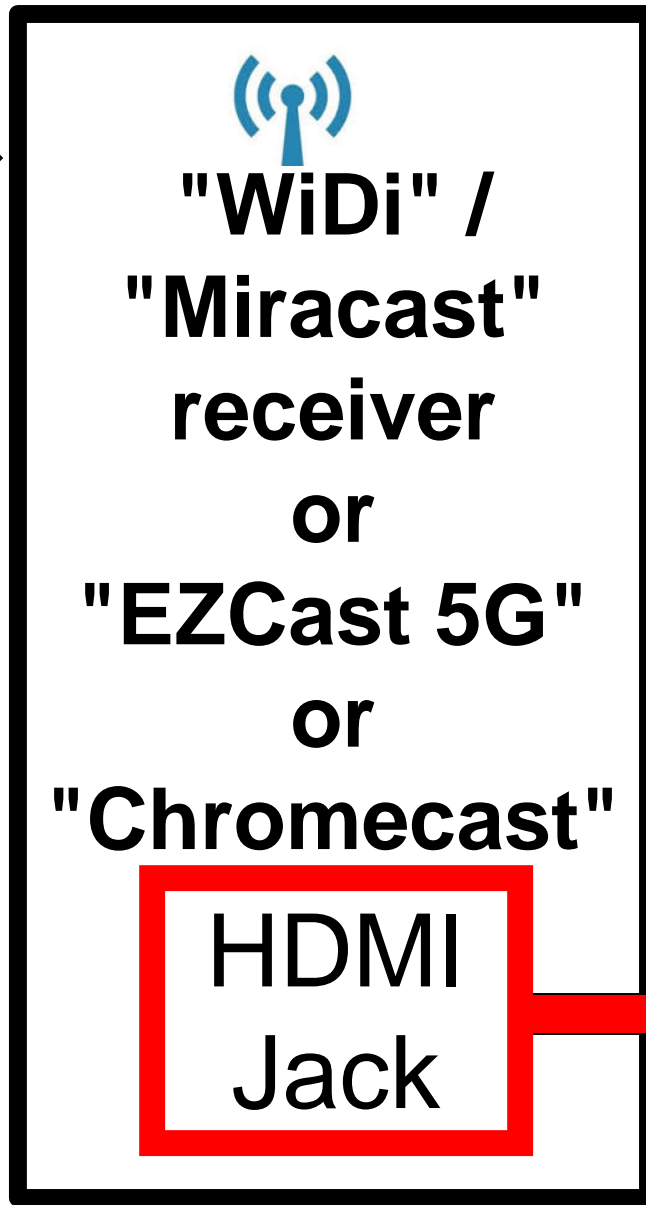
Wireless
Wi-Fi
radio
signals
to the TV
or the
monitor

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

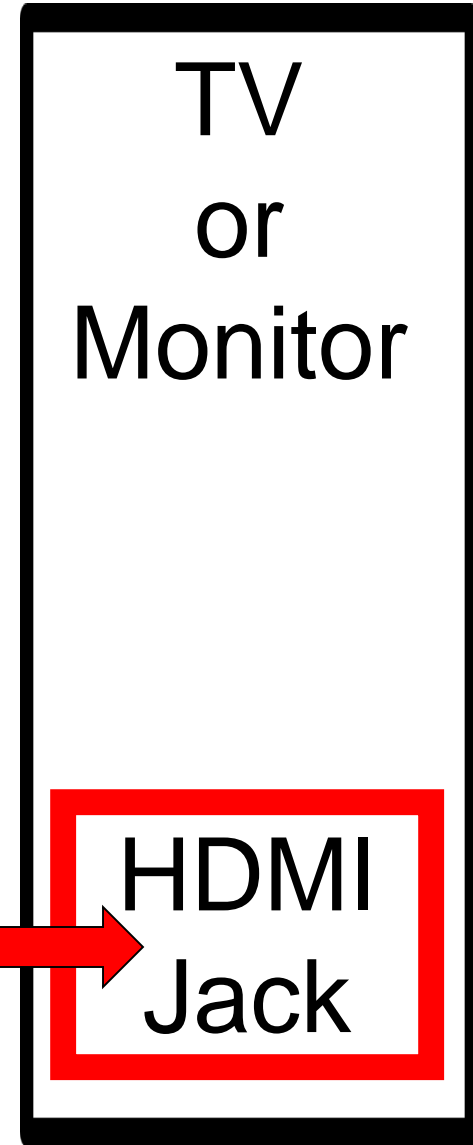
- At the TV or monitor end, the wireless receiver can be connected to the TV or monitor with a short HDMI cable:



Wireless
Wi-Fi
radio
signals
from the
computer



HDMI
cable

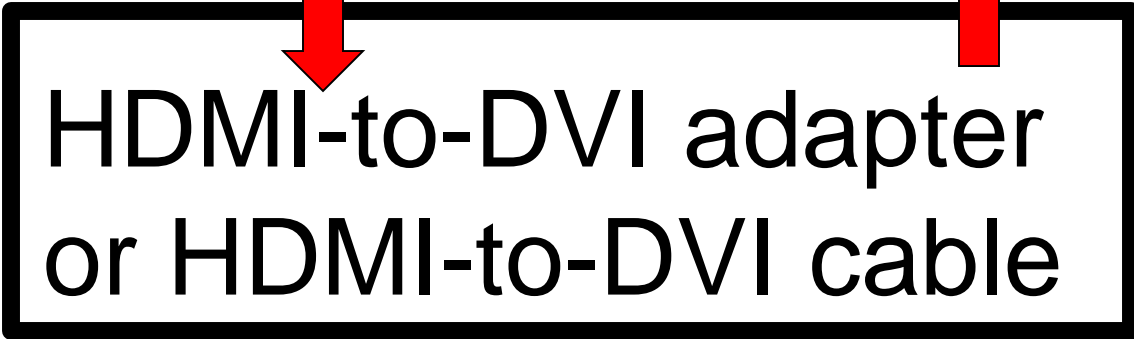
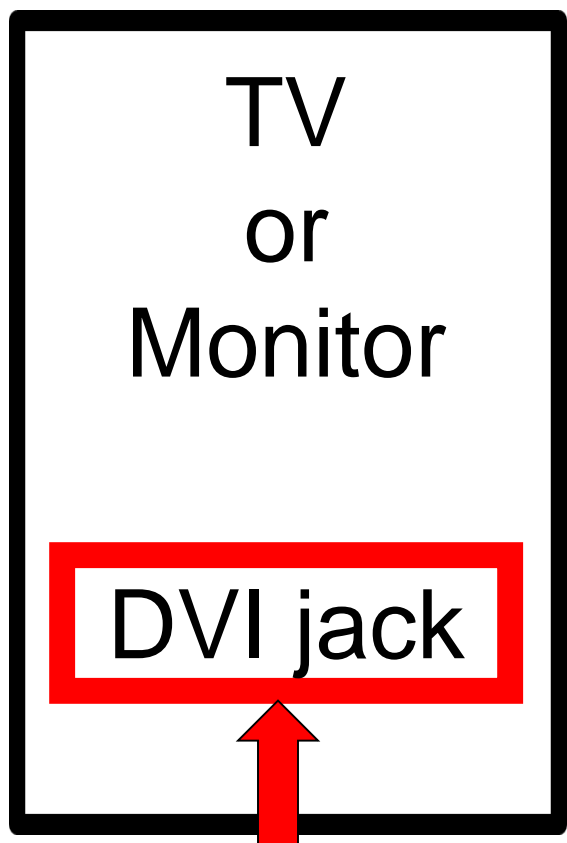
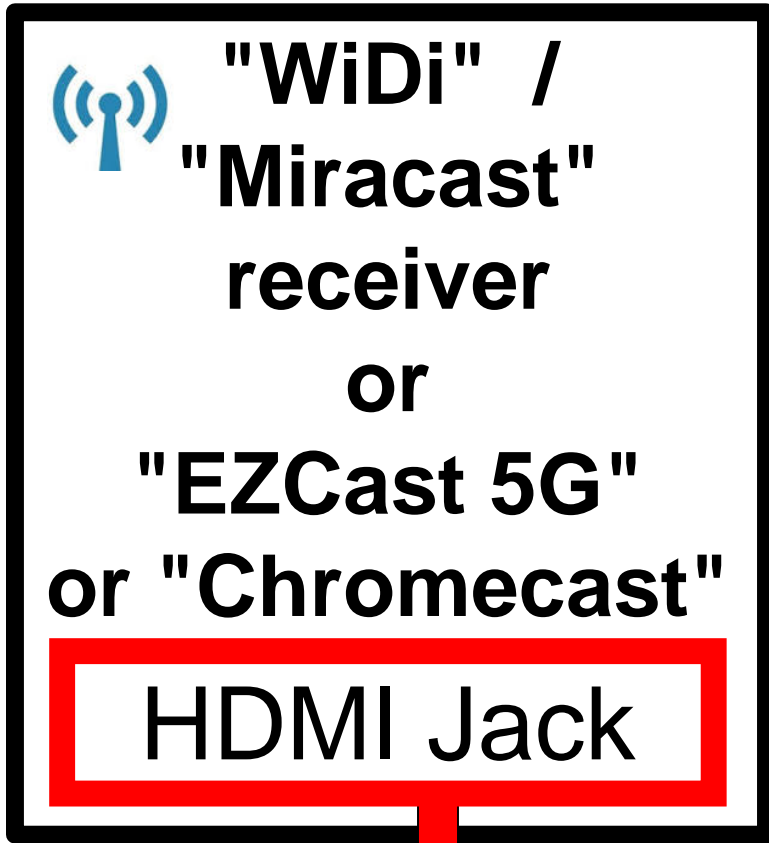


Audio is transmitted from the PC
to the TV or Monitor

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- At the TV or monitor end, if your TV or monitor only has a DVI jack, the wireless receiver can be connected to the TV or monitor with a short HDMI-to-DVI adapter or a HDMI-to-DVI cable. However the adapter causes sound to be lost:

→
Wireless
Wi-Fi
radio
signals
from the
computer



No audio is transmitted from the PC
to the TV or Monitor

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- **"WiDi"** stands for "Intel Wireless Display"
- You can use "WiDi" to wirelessly connect a "Windows.." computer directly to a TV set or to a (second) monitor.
- This wirelessly-connected monitor or TV becomes an additional monitor for your computer.

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- You can use **"EZCast 5G"** to wirelessly stream either the entire monitor screen or specific Web pages or specific online media players or specific local media files from a "Windows.." computer or a Mac to a TV or to a (second) monitor.

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- You can use "**Chromecast**" to wirelessly stream either the entire monitor screen or specific Web pages or specific online media players or specific local media files from a "Windows.." computer or a Mac to a TV or to a (second) monitor.

FOUR Wi-Fi-BASED TECHNOLOGIES FOR CONNECTING A COMPUTER TO A TV OR A MONITOR

- **Warning:**
All of these wireless technologies have too much latency and unpredictability for serious gaming.
(You must use wired HDMI or DVI cables for serious gaming.)

"WiDi" DETAILS

- For our detailed information and advice on "WiDi", please see [http://aztcs.org/meeting_notes/winhardsi
g/wireless/WiDi.pdf](http://aztcs.org/meeting_notes/winhardsi
g/wireless/WiDi.pdf)

"EZCAST 5G" DETAILS

- For our detailed information and advice on "EZCast 5G", please see [http://aztcs.org/meeting_notes/winhardsi
g/wireless/EZCast.pdf](http://aztcs.org/meeting_notes/winhardsi
g/wireless/EZCast.pdf)

"CHROMECAST" DETAILS

- For our detailed information and advice on "Chromecast" please see [http://aztcs.org/meeting_notes/winhardsi
g/wireless/Chromecast.pdf](http://aztcs.org/meeting_notes/winhardsi
g/wireless/Chromecast.pdf)

ACTIONTEC "SCREENBEAM" KIT

- For our detailed information and advice on the Actiontec "ScreenBeam Kit", please see [http://aztcs.org/meeting_notes/winhardsi
g/wireless/Actiontec_ScreenBeam.pdf](http://aztcs.org/meeting_notes/winhardsi
g/wireless/Actiontec_ScreenBeam.pdf)