

220-1101

Peripherals

Peripherals

- Input and Output
- Video
- Audio
- Input and Output
- Storage

Video Devices

- Monitor
 - LCD (Liquid Crystal Display)
 - Plasma
 - OLED (Organic Light Emitting Diode)
 - Projector
- Video adapter
 - Renders the screen image from data presented
 - Digital or Analog

Display Device Types

- LCD – Liquid Crystal Display
 - Flat panel
 - Compact, light weight and energy efficient
 - Needs back light
 - CCFL (Cold Cathode Fluorescent Lamp)
 - Back light source
 - Contain mercury vapour
 - TN (Twisted Nematic) or IPS (In-Plane Switching) to display
 - IPS better viewing angles

Display Device Types

- LCD – Liquid Crystal Display
 - <https://www.youtube.com/watch?v=gf2r717BfvY>
 - TN (Twisted Nematic)
 - Faster
 - Cheaper
 - IPS (In-Plane Switching) to display
 - Superior picture quality
 - Better viewing angles
 - Uses more power

LCD Pixel Addressing

- Active and Passive Matrix
- Both need back lighting
 - Fluorescent Bulb (old & requires more power)
 - AC so requires an inverter that adds weight and complexity
 - LED (New)
- Passive
 - Complex construction compared to Active
- Active doesn't need refreshing
 - Faster response than Passive
 - Better Quality
- DualScan is a variant of passive matrix and gives a better quality

Display Device Types

- LED – Light Emitting Diode
 - Similar to LCD but with different back lighting technique
 - Backlighting technique of two types
 - LEDs are used instead of CCFL
 - RGB LEDs behind the panel
 - Gives deeper blacks
 - Consume less power

Display Device Types

- OLED – Organic Light Emitting Diode
 - Organic compounds provide light emission.
 - No need for back lighting
 - Variety of dimensions used for monitors, TV screens, tablets, and mobile phones.
 - Green technology – less power than LED/LCD
 - Light and thin
 - Flexible and so potential for wearable screens
 - Not as long lasting as LCD but better contrast ratio
 - AMOLED – Active Matrix OLED. Better Quality
 - Super AMOLED
 - PMOLED – Passive Matrix OLED. Cheaper

LCD v OLED

OLED vs LCD visualization



Display Device Types

- QLED – Quantum dot Light Emitting Diode
 - Use non-organic, semiconductor nanocrystals to emit pure red, green, and blue colors.
 - Moderately priced alternative to OLED
 - Marketed to gamers and video professionals who want larger monitors with greater contrast, truer colors, and visual immersion

Display Device Types

- <https://www.youtube.com/watch?v=DQOWh7XVfL4>

Display Device Types

- Projector
 - Display video output to a screen, wall, white board or other surface for viewing.
 - Display video to multiple monitors.
 - Brightness important
 - HID – High Intensity Discharge Lamp
 - 1300 Lumens for darkroom
 - 6000 Lumens for an office
 - Static images require less Lumens
 - **Cool Down very important**

Display Device Types

- Touch Screen
 - Not a display technology
 - Thin transparent screen assembly laid on top of the display
 - Responds to touch, allowing direct interaction with objects on the screen
- Virtual Reality Glasses
 - Head-mounted substitute for a monitor.
 - Can have one or two (one for each eye) displays
 - Currently most units are OLED based



Legacy Display Device Types

- Cathode Ray Tube (CRT)
 - Electron beams within a vacuum tube on a fluorescent screen
 - Three beams, one for each primary colour
 - Large and heavy
 - Not flat panels
 - High internal voltages

Legacy Display Device Types

- Plasma Displays
 - More in common with CRT screens
 - Small cells of ionized xenon and neon gas (plasmas) to provide display (mini neon signs)
 - Very wide screens without physical depth unlike CRT displays
 - Normally over 32 inches (PDP – Plasma Display Panels)
 - Warm to touch in use
 - Suffers from burn-in
 - Quality reduced with age

Burn in



Display Device Settings and Features

Display Setting or Feature	Description
Resolution	<ul style="list-style-type: none">• How many pixels make up the dimensions of the display.• Expressed as width by height.• Higher resolutions can show more items on the screen.
Native resolution	<ul style="list-style-type: none">• Fixed resolution for LCD or other flat-panel displays.• Best quality image when input signal matches native resolution.
Refresh rate	<ul style="list-style-type: none">• Frequency per second that a CRT monitor is refreshed or the screen redrawn.• Expressed as Hz.• 60 to 70 Hz is typical.• No need to adjust LCD refresh rates.
Brightness	<ul style="list-style-type: none">• How much light is emitted from a display device.• Expressed in lumens.
Analog or digital	<ul style="list-style-type: none">• Analog or digital inputs supported.• Most devices providing the input signals (like a computer) are digital.• Display devices such as LCD or LED can support digital input signals, and do so via DVI connections between the input device and the display device.
Privacy and antiglare filters	<ul style="list-style-type: none">• Screens attached to a display device.• Reduce screen glare from other light sources.• Protects display from dust and scratches.• Prevents others from viewing screen contents.
Color depth	<ul style="list-style-type: none">• How many bits used to represent a pixel's color.• Higher number of bits means more colors can be displayed.

Refresh Rates

- The number of times the screen is redrawn per second
- LCD normally fixed at 120Hz
 - Can go as high as 480Hz
 - Higher refresh, better movement displayed.
 - Good for gaming
- Monitor and Adapter have to match setting chosen

Frame Rates

- The number of unique screen contents per second
- 30fps is average
- Refresh rate must be compatible with frame rate the video was shot in
- At 30fps, a refresh rate of 60Hz will mean two copies of each frame shown per second
- If film was shot at 24fps then playback will be poor, so convert to 30fps

Resolution

- Measurement of how many pixels on screen
- Columns x Rows
 - $1024 \times 768 = 786432$ pixels
- Higher resolutions require more memory

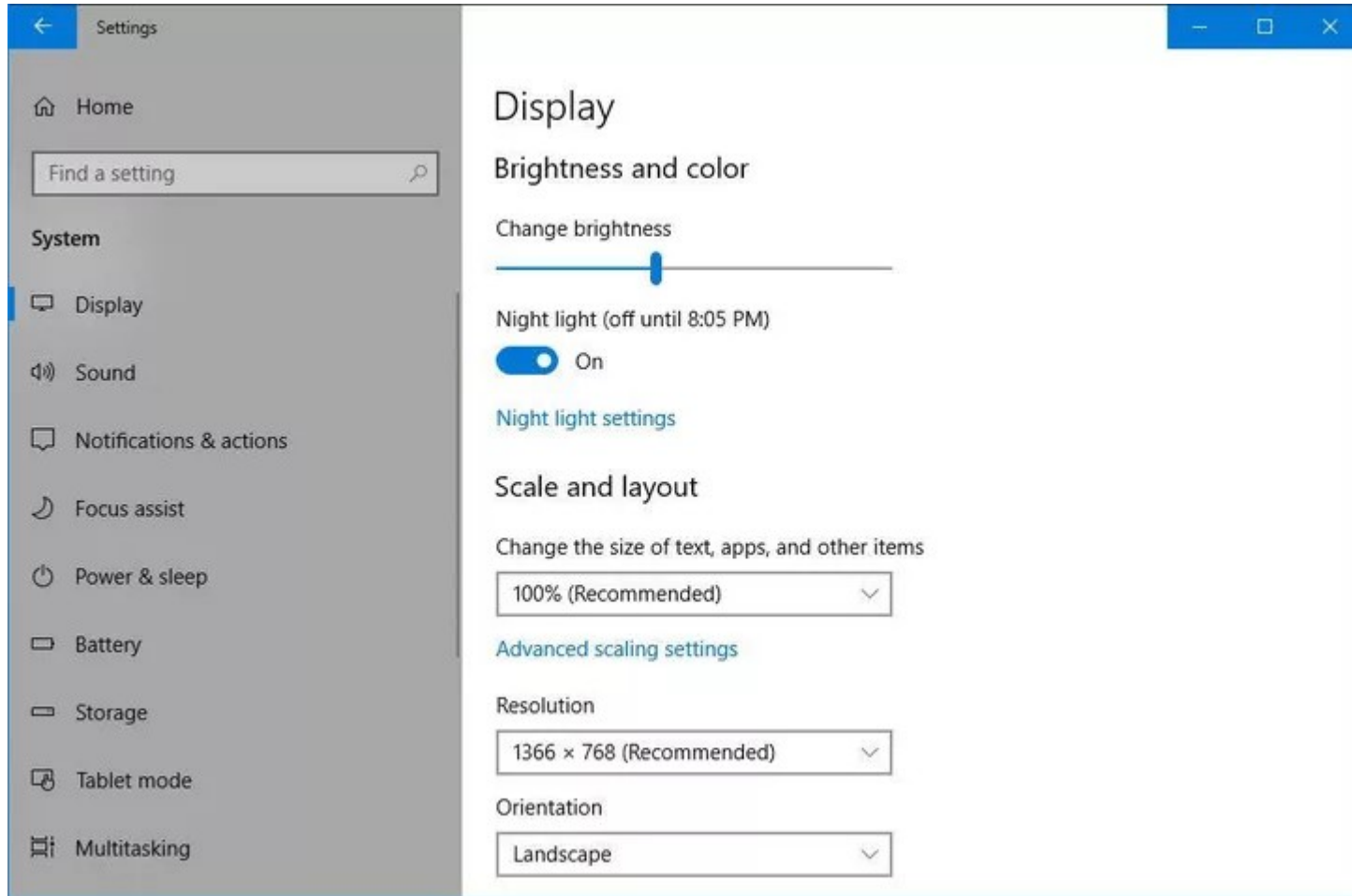
Contrast Ratio

- Measure of the luminance of the brightest colour to that of the darkest colour
- Not the same thing as contrast setting on monitor
- Contrast Ratio for LED backlit LCD is better than older LCD
 - Latest LED lit LCD is 10,000,000:1

Aspect Ratio

- Relationship between horizontal and vertical pixel count
- $16:10 - 16/10 = 1.6$

Windows Display Configuration Tools



Windows Display Configuration Tools

The image shows two overlapping windows from the Windows operating system. The left window is titled "Generic PnP Monitor and Intel(R) UHD Graphics 630 Properties" and has three tabs: "Adapter", "Monitor", and "Color Management". The "Adapter" tab is selected, showing the "Adapter Type" as "Intel(R) UHD Graphics 630" with a small image of the graphics card. Below this is a "Properties" button. The "Adapter Information" section lists the following details:

Chip Type:	Intel(R) UHD Graphics Family
DAC Type:	Internal
Adapter String:	Intel(R) UHD Graphics 630
Bios Information:	Intel Video BIOS
Total Available Graphics Memory:	16463 MB
Dedicated Video Memory:	128 MB
System Video Memory:	0 MB
Shared System Memory:	16335 MB

At the bottom of the "Adapter Information" section is a "List All Modes" button. At the bottom of the entire window are "OK", "Cancel", and "Apply" buttons.

The right window is titled "Settings" and shows the "Advanced display settings" page. It features a home icon and the text "Advanced display settings". Below this is the heading "Display information" and a monitor icon with the text "Display 1: Connected to Intel(R) UHD Graphics 630". The following display specifications are listed:

Desktop resolution	3840 × 2160
Active signal resolution	3840 × 2160
Refresh rate (Hz)	60 Hz
Bit depth	8-bit
Color format	RGB
Color space	Standard dynamic range (SDR)

At the bottom of the "Settings" window is a blue link that reads "Display adapter properties for Display 1".

Multiple Displays

- Typically two displays.
- Professional workstation or gaming environment.
- Primary monitor needs to be designated.
- Second monitor for additional desktop space or duplicate display.

Settings SYSTEM Find a setting

Display

Notifications & actions

Apps & features

Multitasking

Tablet mode

Battery saver

Power & sleep

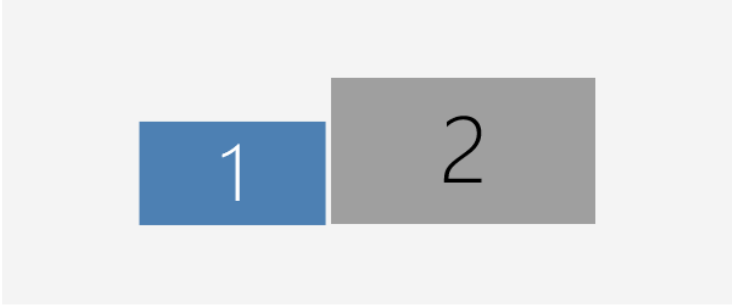
Storage

Offline maps

Default apps

About

Customize your display



Identify Detect

Change the size of text, apps, and other items: 100% (Recommended)

Orientation
Landscape

Brightness level

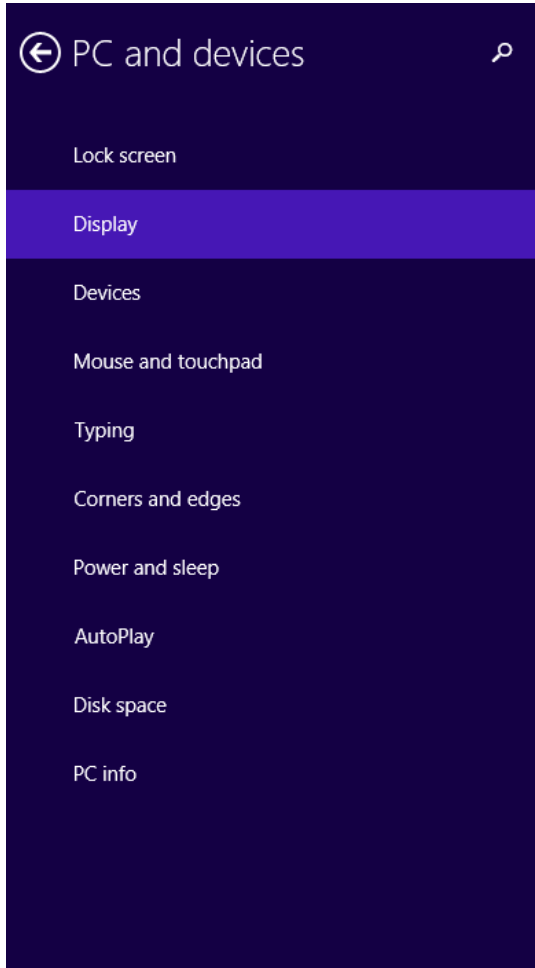
Multiple displays
Extend these displays

Make this my main display

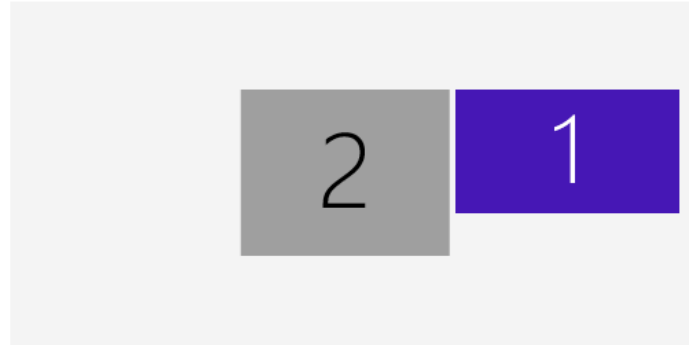
Apply Cancel

[Advanced display settings](#)

Windows Display Configuration Tools



Customize your display



Identify Detect

Resolution: 1366 × 768 (Recommended)



Orientation

Landscape

Multiple displays

Extend these displays

Make this my main display

Apply

Cancel

Common Video and Display Issues

- Dark screen
- Dim image or no image in screen
- Flickering or distortion on CRT monitors
- Display turns itself off
- Application problems
- Defective pixels
- Color issues
- Physical damage
- Distorted geometry
- Burn-in
- Oversized images and icons
- Video card issues

Multimedia Devices

- Can be Input or Output devices
- Transfers sound, images or a combination of both

Multimedia Input Devices



Digital camera



Camcorder



Webcam



Microphone

VR Headset

- Two Common types
 - Connect to a PC
 - Use a smartphone as the screen
- High hardware requirement



Keyboards



**Standard (QWERTY)
keyboard**



Dvorak keyboard



Ergonomic keyboard

<https://www.youtube.com/watch?v=tIJNusYZXMA>

Pointing Devices



Mouse



Trackball



Touch pad



Trackpoint



Gamepad



Joystick

Peripherals - Misc

- Barcode or QR Scanner
 - Uses Lasers or LED's to read
- Magnetic or Chip Readers
- NFC
 - Near Field Communication
 - Tap to pay device
 - Max range about 3"
 - Speeds transactions



Peripherals - Misc

- Scanner
 - Reflects light off surface and measures the reflection
 - DPI – Dots Per Inch
 - CCD – Charged Coupled Devices used today
- All in one
 - Scanner, Printer, and Fax
 - ADF – Automatic Document Feeder

KVM Switches

- Keyboard, Video, Mouse
- Control multiple computers using one set of Input and Output devices
- Often found in server racks



Storage Devices

- External Devices
 - USB
 - ESATA
- NAS (Network Address Storage)



Need to Know

- Recognise and understand different peripherals and converters
- Recognise and describe display connectors
- Understand cables required for peripheral attachment
- Recognise different HDD cables
- Know the various multi purpose cables and their connectors
- Understand the purpose of video peripherals
- Understand Audio Peripherals
- Know about various I/O devices
- Understand external storage options