



## Video Display Screens - HD and UHD

## Pixel Pitch and Resolution

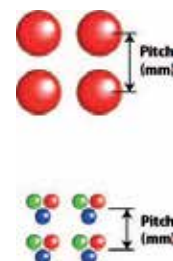
When you are considering buying an LED display there are many options to consider. Not only the type of display that you require and the budget that you allocated but also the size of the display and the pitch and resolution of the LED sign. LED pitch and resolution are industry terms that you will come across when you are researching LED display technology and we thought that we would explain it to you as it's not the simplest thing to understand!

### PIXEL PITCH

Pixel pitch is the distance from the centre of an LED pixel or cluster to the centre of the next pixel / cluster measured in millimetres. When it comes to buying your LED display finding the right pixel pitch that's right for your application is vital to the success of your display.

Pixel pitch typically ranges from 0.8mm to 6mm for indoor LED displays and 6mm to 10mm for outdoor displays although further options are indeed available, even up to 100m pitch for specific outdoor applications.

The pixel pitch is a defining factor of a large screen's viewing distance: the closer the pixels are the closer the minimum viewing distance will be and also the higher quality of the image displayed and the cost per sq. metre. A larger pitch will cost you less but you risk losing the clarity of the image



### VIEWING DISTANCES FOR VARIOUS LED PITCH

One of the primary factors in deciding on what pitch size will be right for you is considering what the viewing distance will be of your primary audience. The viewing distances are somewhat subjective and depend on the distance type, content and the physical size of the screen. But essentially a good rule of thumb is to say that the minimum distance is measured by taking the pitch and converting it into metres, i.e. a 6mm pitch has a minimum viewing distance of 6 metres. If you stand too close to a display you will see pixelation and the image will not be clear. That is to say, there is a minimum distance beyond which a human eye with natural or corrected vision of 20/20 can no longer discern individual pixels on a particular display. The maximum distance depends on the screen's dimension but it can roughly be calculated by multiplying the screen's height by 30. For example a 4 x 3 metres screen (3m x 30) can be viewed from 90 metres.

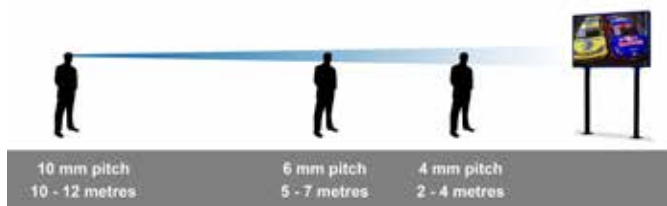
### GET THE CORRECT PITCH FOR YOUR VIEWING DISTANCE

The illustration right shows you the same size of display with different resolutions and pitch but shown at the correct viewing distance so the image appears to the eye to be the same. Obviously, the 10mm pitch screen costs much less than the 3mm screen but will only be suitable for viewing distances over 10 metres, whereas the 3mm pitch can be viewed at 3 metres and above.

**3mm pitch can be viewed from 3 metres**

**6.67mm pitch can be viewed from 6 metres**

**10mm pitch can be viewed from 10 metres**



*Image above is a 10mm pitch screen, 150 x 100 resolution viewed at 10 metres*



*Image above is a 3mm pitch screen, 500 x 333 resolution viewed at 3 metres*

## Pixel Pitch and Resolution

### LED SCREEN RESOLUTION

Resolution is the number of LED pixels contained in the physical area of the LED display. The more pixels you have per square metre, the more detail you will have which gives you a higher resolution. For a set screen size, the closer the LEDs are, (i.e. smaller LED pitch) the more LEDs you have in that area, hence the higher the screen resolution. This means, of course, the overall quality of the image will be better and your viewing distance will be reduced, but this comes at a cost as the price per square metre goes up.

The screen resolution tells you how many LED pixels/clusters there are horizontally and vertically thus allowing you to calculate the overall LEDs. It is usually written in the form 512 x 256 resolution. This means that there are 512 pixels wide and 256 pixels high. As we've mentioned, the key to a quality image on a large-format video LED screen is to buy the highest resolution you can afford. The higher the resolution the sharper the image. Once you know your viewing distance you can then decide on the pitch size and resolution within your budget.

Each square metre of an LED screen usually contains anywhere between 62,500 pixels (250x500 pixels) down to 9,216 pixels (96x96 pixels) depending on the module's pitch.

Now, different size screens can still have the same resolution, but the different pitch size means that the screens will be different sizes. You can see in the illustration below, the resolution on all four screens is 128 x 96 and the pitch varies from 3mm to 10mm. But at 4 metre viewing distance only the 3mm and 4mm look crisp.

### RESOLUTION - WHY DOES IT MATTER?

An LED screen's resolution is defined by its total number of vertical and horizontal pixels (dots that form the picture). The video signal that the LED screen will be reproducing has a native resolution of about 486/576 (NTSC/PAL) vertically and anywhere from about 240 to 720 horizontally (depending on the quality of the source). To reproduce these signals with no loss of image resolution, you want a minimum LED screen resolution of about 648 x 486 (NTSC) or 768 x 576 (PAL). If you use an LED screen with fewer pixels than the input source, the images will have less resolution than the source. However if the LED screen is designed properly it can still give an acceptable appearance for video images. LED screens of approx. 1/3 of VGA resolution can provide a very acceptable video image, so around 200x150 pixels is possible, we would recommend a minimum of 288 x 170 pixels.



Above: 144 x 72 pixels, Below: 480 x 240 pixels



*These LED screens have the same screen resolution but with different LED pitches, they are different sizes. Viewed at 4 metres, so only the 3mm and 4mm look crisp.*



## Indoor LED Video Screens

### CREATE IMPACT INDOORS

A high-resolution LED digital video wall is a strong and very versatile communication tool. An indoor LED wall provides unlimited communication possibilities. So the marketing and advertising potential of an indoor LED video screen is limitless. For indoor environments such as shopping centres, arenas, offices, hotel lobbies, churches, receptions and many more applications a video screen is an invaluable tool.

- High / Ultra high resolution displays for spectacular close range viewing
- Integrated SMD LEDs give incredibly high resolutions
- Stunning picture quality, suitable for close viewing distances
- Superb high resolution digital display
- Front service access for ease of maintenance
- Small cabinet size allows flexibility to create display of any size or shape
- Black SMD LED body with black mask raised up the contrast to 4000:1
- Network Control
- Consistent picture quality

The Indoor LED video screens are available in many different pixel pitches to suit your requirement: From **0.8mm pitch up to 5mm pitch** and in many sizes of cabinets giving full flexibility on overall screen size.

Typically **640 x 480mm** and **400 x 300mm** are popular cabinet sizes.

### FEATURES

The Indoor LED Screens have many key features that are extremely important to consider when purchasing an LED video screen.

#### Seamless Modular Design

An overall LED video screen will be made up of multiple cabinets giving a seamless finish to the front of the screen. The cabinets are bolted together at the rear and your screen can be made up of as many cabinets as you'd like.

#### High Brightness and Contrast Ratio

These two principles go hand in hand on a quality display. Equipped for all indoor ambient light conditions the 800 cd/m<sup>2</sup>, the high brightness display is sure to give you optimal brightness and with an ultra-high contrast ratio of 6000:1 the LED screens deliver deeper blacks, vivid colours and clear visibility across the display without sacrificing brightness.

#### Easy Installation and Maintenance

The light and compact cabinets are simply bolted together for easy installation and then simply connect the cables. For maintenance the modules can be removed from the front by either a key as shown or a magnet when magnetic modules are used.



# Full Colour Video Screens

## Indoor LED Video Screens

### Lightweight and Slim Design

The typical indoor cabinet most often used, size 640 x 480mm, weighs approx 7kg and is 70mm in depth, meaning that the light weight of the cabinet reduces the stress on any mounting structure.

### From Beginning to End Project Management

Every LED screen is unique and each will come with its own challenges. LEDsynergy will be with you guiding you through every step, from its conception and design to final installation and beyond, where we can offer you ongoing maintenance where required.

### Stunning Image Quality

The state of the art SMD LED technology delivers truly stunning image quality across the seamless display. With advanced video processing technology producing accurate and vibrant colours your LED screen with certain attract attention and enthrall its spectators. Colour calibration is important, the video signal and internal hardware is calibrated to ensure that the colours on the screen are true.

### High Technical Specification

Our LED cabinets are manufactured in the UK to a very high standard, not only do we insist on the best LEDs but every part of the cabinet, from the inside out, is to a high specification going through many strict quality control procedures. Indoor screens have a low heat emission and are of course silent.

### Bespoke Video Wall Screens

Each LED project has different requirements, whether your requirement is for a standard LED screen but with a bespoke integration requirement, bespoke software or alternatively your application is for a completely bespoke design using non-standard cabinets such as hexagons, as shown right, or flexible LED vertical strips as shown below right.

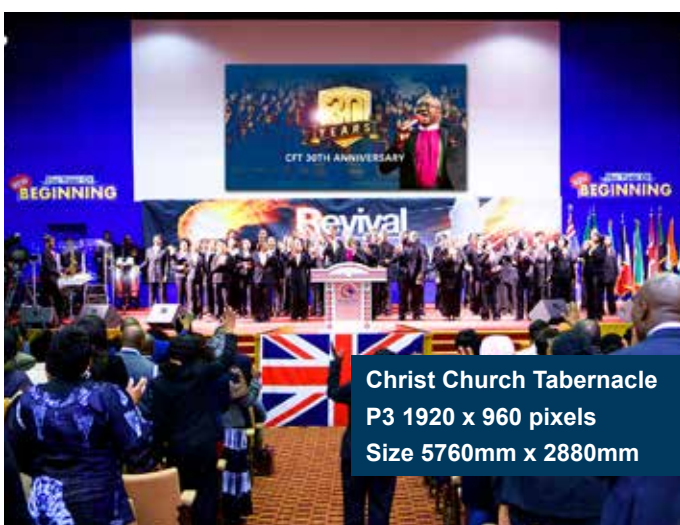
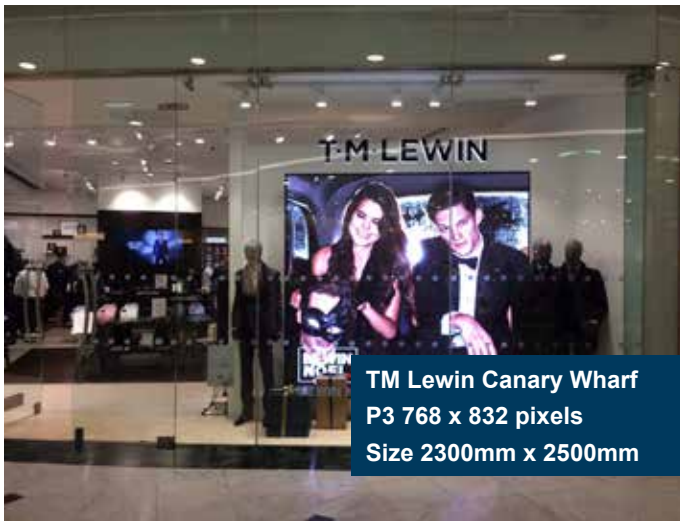
### Programming Your LED Screen

The screens are easily updated with many different options for communications, wired, Wi-Fi, Cloud, call us to discuss an option that will suit your application.



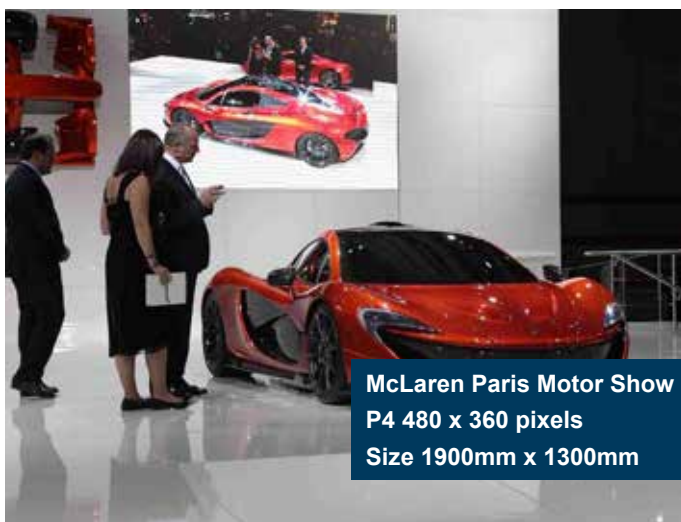
# Full Colour Video Screens

## Indoor Video Screens - Examples of Pitch & Resolution

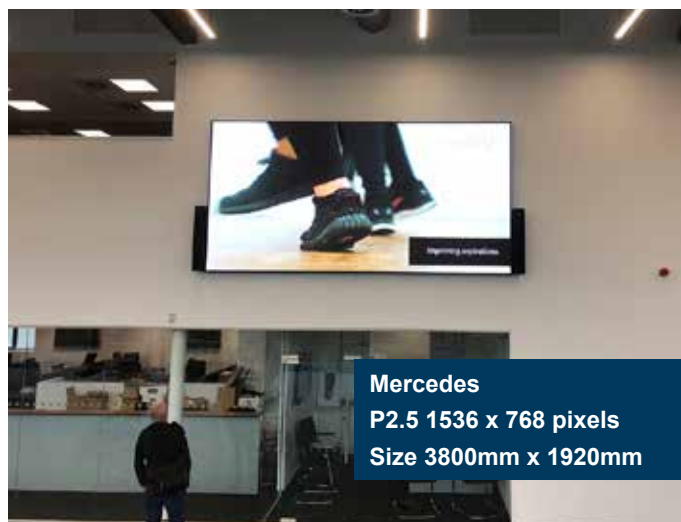


# Full Colour Video Screens

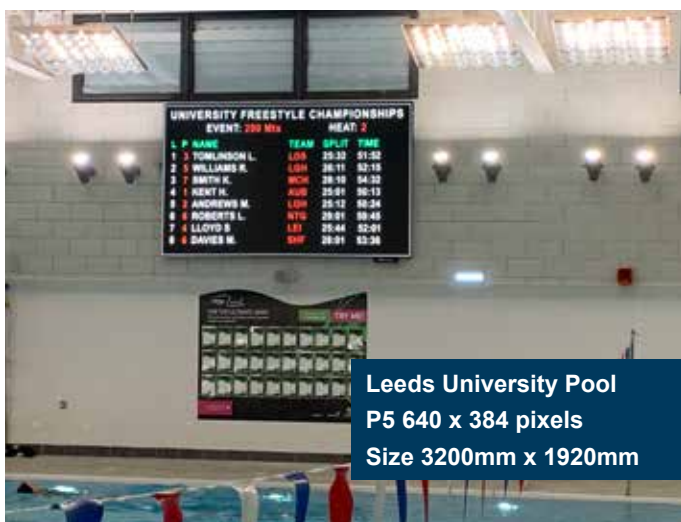
## Indoor Video Screens - Examples of Pitch & Resolution



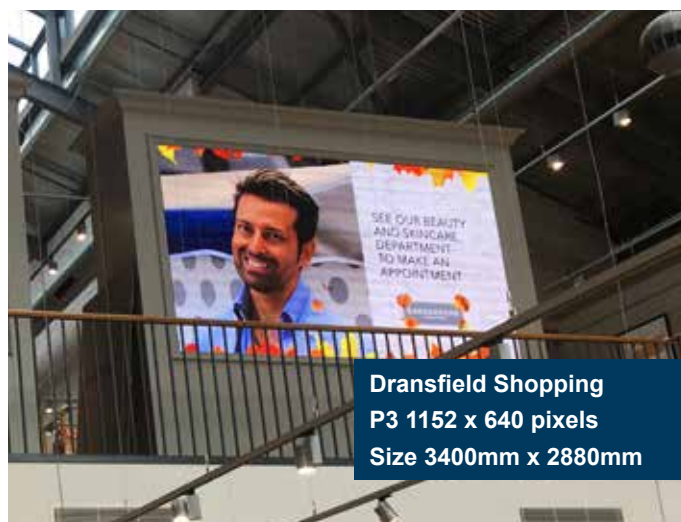
**McLaren Paris Motor Show**  
P4 480 x 360 pixels  
Size 1900mm x 1300mm



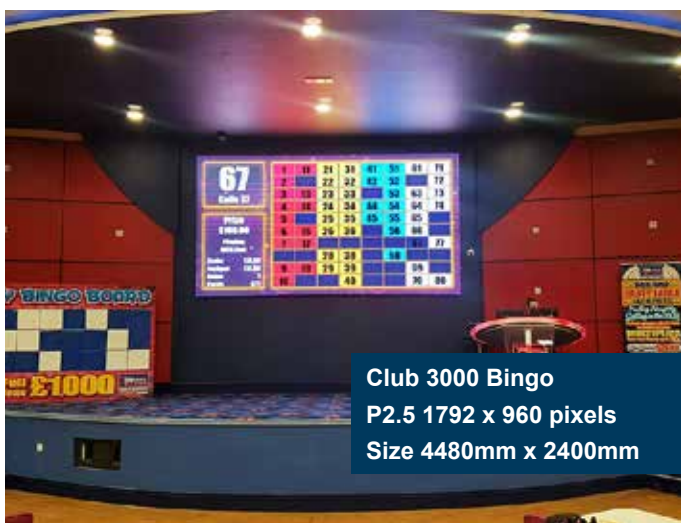
**Mercedes**  
P2.5 1536 x 768 pixels  
Size 3800mm x 1920mm



**Leeds University Pool**  
P5 640 x 384 pixels  
Size 3200mm x 1920mm



**Dransfield Shopping**  
P3 1152 x 640 pixels  
Size 3400mm x 2880mm



**Club 3000 Bingo**  
P2.5 1792 x 960 pixels  
Size 4480mm x 2400mm



**Bristol Bears Rugby**  
P3 1070 x 640 pixels  
Size 3210mm x 1920mm

## Outdoor LED Video Screens

### STUNNING OUTDOOR SCREENS

Outdoor LED digital screens are manufactured in the UK in LED in module format which gives you a great deal of flexibility with size combinations.

With creative graphics, text, animation and video you can create a truly dynamic promotional video. Combine this with one of our LED digital displays or LED wall systems and you can make a huge impact on your audience.

- Stunning picture quality, suitable for close or far viewing distances
- Rugged display for demanding outdoor applications
- Modular LED cabinet design allows virtually any size or shape of display
- Integrated SMD LEDs allow for incredibly high resolutions
- Available with front or rear maintenance service access
- High brightness levels from 7500mcd for exceptional picture quality in direct sunlight
- IP65 waterproof rating to withstand the harshest of weather conditions
- Highest quality LEDs used

The outdoor LED video screens are available in many different pixel pitches to suit your requirement: From **4mm pitch up to 10mm pitch** and in many sizes of cabinets giving full flexibility on overall screen size.

Typically **960 x 960mm** and **500 x 500mm** are the most popular sizes for outdoor cabinets.

The smaller pixel pitch screens are ideal for pedestrian areas and information boards where the viewing distance will be relatively close, from 2 metres, such as in retail outlets, libraries, bars etc. Use for informational use, promotional use and to stream live events and music videos to customers.

The larger pitch displays, the 8mm and 10mm are best suited to billboards within shopping centres or indoor events and arenas / auditoriums where the viewing distance would be 8 or more metres, making it ideal for larger promotions within the general indoor shopping centre or within auditoriums for shows, TV shows, large promotional and marketing billboards and many more applications.





# Full Colour Video Screens

## Outdoor LED Video Screens

### FEATURES

#### Seamless Modular Slim Design

An overall LED video screen will be made up of multiple cabinets giving a seamless finish to the front of the screen. The cabinets are bolted together at the rear and your screen can be made up of as many cabinets as you'd like.

The typical outdoor cabinet most often used, size 960 x 960mm, weighs approx 30kg and is 90mm in depth meaning that the light weight of the cabinet reduces the stress on any mounting structure.

#### High Brightness and Contrast Ratio

With an impressive high brightness of 6000 cd/m<sup>2</sup>, the display has outstanding visibility, the screen is sunlight readable even in direct sunlight ensuring that your content is always seen. With an ultra-high contrast ratio of 6000:1 the LED screens deliver deeper blacks, vivid colours and clear visibility across the display without sacrificing brightness.

With an ambient light sensor you can be assured that the luminosity of your screen will always be at its optimal level, depending on the brightness of the day or night.

#### Easy Installation and Maintenance

The compact cabinets are simply bolted together for easy installation. For maintenance the modules can be either front or rear access depending upon the installation restrictions. The modules can be removed from the front by a key as shown or accessed from the rear of the cabinets via doors, as shown below.

#### From Beginning to End Project Management

Every LED screen is unique and each will come with its own challenges. LEDsynergy will be with you guiding you through every step, from its conception and design to final installation and beyond, where we can offer you ongoing maintenance where required.

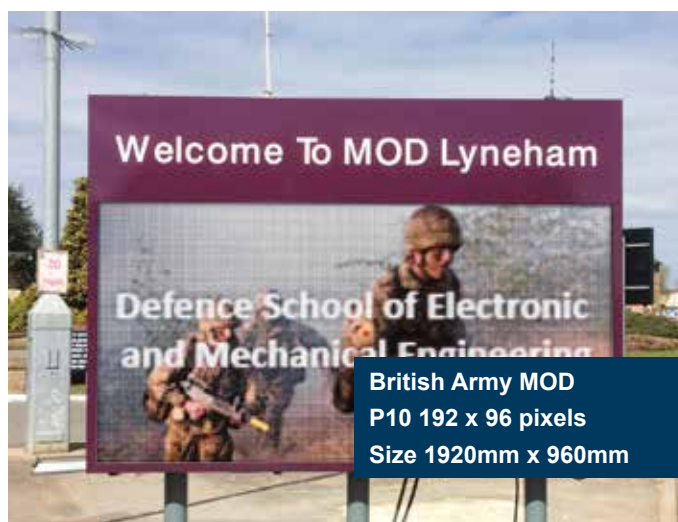
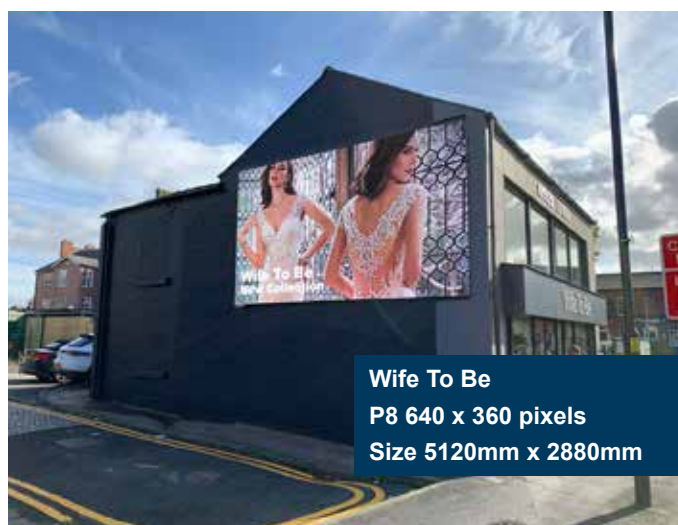
#### Fully Weatherproofed

Designed with a robust aluminium enclosure to give protection from the wet weather conditions. The outer casing is IP-rated which means it also keeps out airborne swarf, dust and other particles.



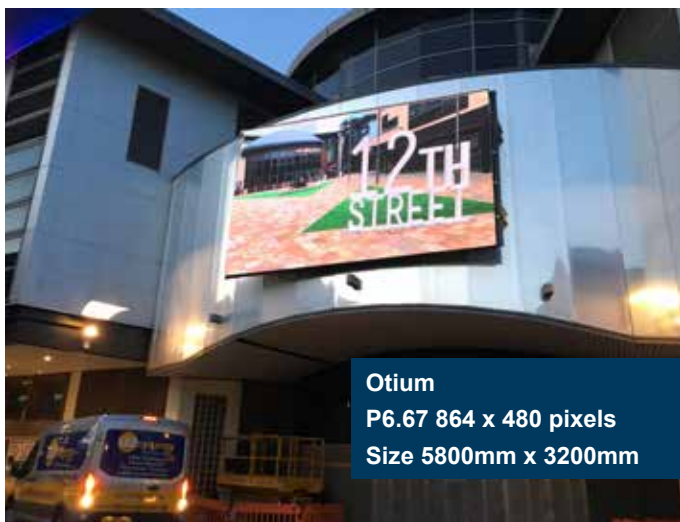
# Full Colour Video Screens

## Outdoor Video Screens - Examples of Pitch & Resolution



# Full Colour Video Screens

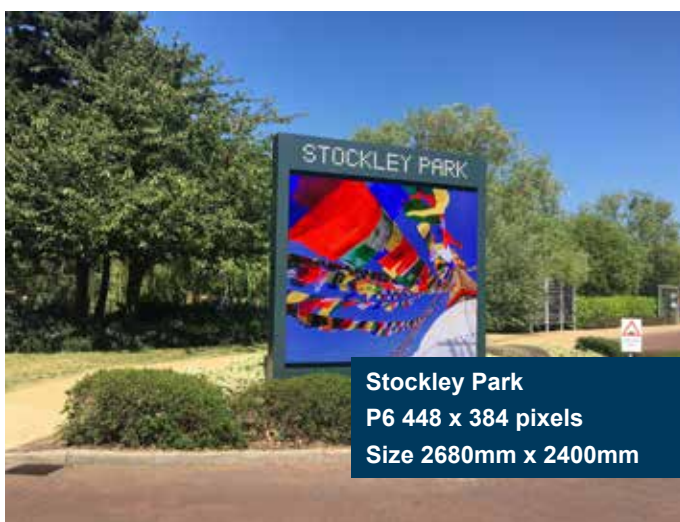
## Outdoor Video Screens - Examples of Pitch & Resolution



Otium  
P6.67 864 x 480 pixels  
Size 5800mm x 3200mm



The Concorde Jazz Club  
P10 160 x 112 pixels  
Size 1600mm x 1120mm



Stockley Park  
P6 448 x 384 pixels  
Size 2680mm x 2400mm



Marlowes Shopping  
P8 400 x 240 pixels  
Size 3200mm x 1920mm



Birmingham Rep Theatre  
P16 702 x 156 pixels  
Size 11200mm x 2500mm

## Fine Pitch Indoor Video Walls

### CREATE DYNAMIC PRESENTATIONS

UHD LED screens have a wide variety of applications, not least in the field of commerce. As an extremely powerful communication tool when deployed as either a single screen or a multi-screen video wall, businesses from all sectors are provided with a multi-purpose sales and information facility with a UHD screen. The commercial applications for large UHD LED screens are endless.

#### Shopping Malls

Shopping centres and malls are large, noisy buildings with an awful lot going on at the same time. Traditional types of advertising can get lost amongst all this noise, but large LED UHD screens are perfect for grabbing the attention of shoppers. Whether used to show directions, display public announcements or special offers, large LED screens are the perfect solution.

#### Reception Areas

Commercial reception areas are the front window of any business and LED screens offer a sophisticated, professional way of displaying important information for visitors. LED screens are so useful and informative, the first impressions always count for a business.

#### Conference Rooms

Large UHD LED screens are the ideal enhancement for conference rooms. Once installed your screen can be linked up to your laptop or smartphone to provide your attendees with a vivid, punchy and eye-catching presentation.

#### Offices

The office is another environment that can benefit from the installation of a large UHD screen, combining notice board facilities, with a presentation platform and a constantly updated news feed. They can also be used in call centres to display real-time performance data in a clear and distinct way.

#### Hotels

Another commercial setting that UHD LED screens are useful is hotels and hospitality. Either in reception areas, meeting rooms or bedrooms, the LEDsynergy team has the necessary experience to deal with large-scale multiple installations required to fit out hotels.



# Full Colour Video Screens

## Fine Pitch Indoor Video Walls

### FEATURES

The Indoor UHD LED Screens have many key features that are extremely important to consider when purchasing a fine pitch LED video screen.

#### Super Fine HD Pixel Pitch

All the screens available have a full high definition resolution and a standard 16:9 aspect ratio. With the fine pitch and slimline design these displays make the ultimate in premium presentation or advertising video walls.

#### Lightweight and Slim Design

Despite the large size of the screens the fine pitch LED video walls have a compact design with a slim depth of just 70mm and each cabinet weighing just 7kg, meaning that the light weight of the cabinet reduces the stress on any mounting wall.

#### Easy Installation and Maintenance

The light and compact cabinets are simply fixed together for easy installation and then simply connect the cables. For maintenance the modules can be removed from the front for efficient and convenient maintenance.

#### SMD Technology & Optimised Engineering

SMD (Surface Mounted Diode) is the optimum form for LED Video Walls. Combining three miniature LEDs of different colours into one unit enables fine pitch screen to have perfect colour uniformity.

Equipped for all indoor ambient light conditions the high brightness display is sure to give you optimal brightness and with an ultra-high contrast ratio you can be sure that your picture quality will be outstanding.

The technology we provide is optimised for superlative performance in all conditions and our large screens are the biggest and best quality you'll find anywhere.

#### Powerful Communication Display

These UHD LED video screens are an ideal tool in the commercial environment, receptions, meeting rooms and conference areas benefit hugely from the outstanding quality of image. Likewise the screen are an extremely effective indoor advertising and promotional medium in shopping centres, theatres, cinemas and many more applications.

### DIRECT VIEW

*New name for LED DISPLAYS to differentiate between LED TVs and monitors.*

*SYNERGY® Direct View LED displays are a cost-effective, all-in-one alternative to traditional video walls. Seamless, brighter screens backed with 40 years' experience and MADE IN BRITAIN*



## Screen Content

### GETTING THE BEST OUT OF YOUR RESOLUTION

Content creation is vital and needs to be done in parallel with hardware specification to ensure that when your new LED sign is installed you have appropriate and impactful material to display on it that will meet your marketing objectives.

Adopt good design practice: If you have a good designer that understands LED design rules, your piece should stand out among your competition. An LED screen is usually a significant financial investment and so often the final implementation is let down by poor or overly complicated design treatments. Ensure that you budget for ongoing content development and a good designer is an absolute worthwhile expenditure. And don't forget to check and test your content.

Review existing content on the LED display every week to ensure it's working properly and nothing looks dated. Also seeing the content as your spectators do provides an essential perspective and should help create future content and the right experience for them. Understand your audience and make sure that your content is well suited and timely.

### CONTENT IS KING

There must always be fresh, updated, curious or useful content on your LED display - not just advertisements - otherwise people will get accustomed to them and become bored with the LED screen and stop looking at it. You must constantly provide updated content – so if it's an information system, the content has to be up-to-the-minute; if in high daily footfall areas new, useful and interesting content should be uploaded every day or at least every time you expect the same audience will revisit the same location.

### CONTENT BALANCE

Creative content may grab the spectator's attention but making a piece that is stunning or memorable without a clear call to action could fall short of your intent. This happens when people concentrate too much on creative content and forget the purpose of the content. Remember what you want anybody looking at your LED screen to do is act on whatever they've seen.



These LED screens show how good content can be informative and attractive. Images catch they eye then you can entice your audience to read the information.

As you dive into content creation for your LED you will no doubt develop your own rules but these 'best practice' guidelines should get you started.

Remember, LED displays are incredible tools for communicating your message but they are only as good as the content you run on them.



## Technical Information

### SPECIFICATION

Using the latest technology and design features, the LEDsynergy range of full colour video screens incorporate patented design control systems, and with the optional extra of full diagnostic control to ensure that we offer you the best quality LED displays as standard.

#### Ultra High Refresh Rate

The 'refresh frequency rate' refers to the screen update rate, which is usually expressed in Hertz (Hz). Generally speaking, the visual refresh frequency is above 3,000Hz, which is a high-performance LED display screen. The higher the visual refresh rate, the more stable the screen display, and the smaller the visual flicker. If you have a low 'refresh frequency rate', in addition to the horizontal stripes that appear during video recording and photography, it will cause discomfort when viewing, and even cause damage to the eyes.

#### Bit Rate & Greyscale

The greyscale refers to how well the display differentiates between the colour gradation of different colours between the darkest and brightest colours and is a result of how well the screen captures the range of grey between black and white. A bit depth of a display is essentially a representation of its processing capacity. The LEDsynergy high-performance LED displays has a colour gradation of 16 bits producing a dynamic range of 281 trillion colours.

If the number of grey levels is insufficient, the colour gradation may not be smooth enough to fully display the colours of the video, which greatly reduces the LED display effect.

#### Colour Space

While the 'greyscale' controls the tonality of your colours and 'bit depth' controls the number of colours your display can possibly create, the 'colour space' of a display determines the spectrum within which all those colours exist. There is only a certain range of colours that are perceptible to the human eye. To graphically represent the finite differences between colours, in simple terms, the International Commission on Illumination (CIE) created a 2-dimensional graph that plots colour based on chromaticity (a product of hue and saturation) on the X axis and brightness (also called luminance) on the Y axis. This was first created in 1931, and is thus commonly referred to as the CIE 1931 Chromaticity Diagram. The diagram, as seen right, graphically represents the visible colour space.

Within the range of colours we can perceive, there are smaller subsections of colours that digital displays can recreate. Digital displays are getting better and better at recreating the colours of real life, pushing their native colour spaces closer and closer to the limits of the visible colour space.

**For all specifications and more information on LED Video Displays, give us a call.**

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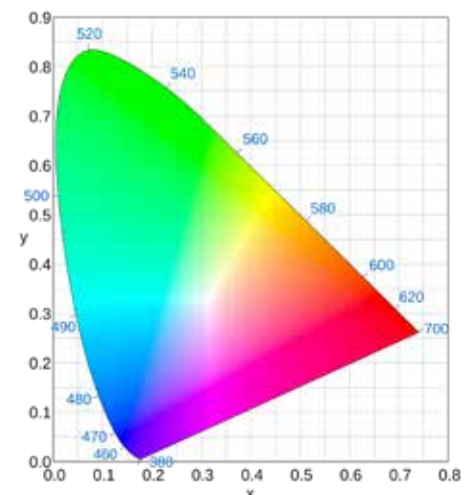
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Low Refresh Rate



High Refresh Rate





[www.LEDsynergy.co.uk](http://www.LEDsynergy.co.uk)

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