



CDS Transparent LCD Displays (FAQs)

Dated: 17th January 2024

Crystal Display Systems' Transparent FAQ document is the world's first of its kind. We're happy to share our knowledge with new contacts and customers. Contact us at info@crystal-display.com for any questions or feedback.



crystal-display.com

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FOR INDUSTRIAL DISPLAY SOLUTIONS

Transparent LCD Panels and Kits

1) Does the Transparent Display go white (Clear) when powered off?

- No, they are dark (somewhat transparent) but need a voltage across the display, and when you apply a white pixel, the displays become transparent. The transparency rate is around 15%.

2) How does the content work?

- You simply create content in the same way you would for any other display, but you must just remember that black stops the light completely and white makes the display translucent (see through). Therefore, you can make products behind the display appear and disappear in front of your eyes.

3) Does it work in sunlight?

- Although you can use these in sunlight the effect will not be as impressive compared to installations in lower light environments. The films we use in our LCDs do have sunlight readable properties, but you will also need to ensure sufficient light behind the transparent display is present and ensure limited dissipation, so the backlight is more effective than the sunlight in front of the display. When used in direct sunlight you should also apply Ultraviolet (UV) protection on the front glass and be mindful of overheating. We can also offer custom optically bonded versions which will improve clarity as well as ruggedness.

4) Will it work with out a backdrop?

- Possibly BUT there must be a lot of light to enable the image on the screen to be shown effectively and this is difficult unless the light is boxed in as it dissipates very quickly. We do not recommend this, but it is possible with the correct lighting solution. Here are some examples of transparent displays just simply put against windows with no additional lighting:



5) What colour backdrop is needed?

- It should be a white backdrop or background to optimise the contrast and image quality as well as dispersing the backlight to achieve the best results. You can see this in our transparent showcase products – click here for our [transparent showcases](#).

General Note on Backlighting

The transparent displays DO NOT include backlights and so the user / integrator etc. must supply their own backlighting for the box / showcase solution with sufficient brightness to ensure a good crisp image to optimise the performance.

6) What brightness is needed behind the screen?

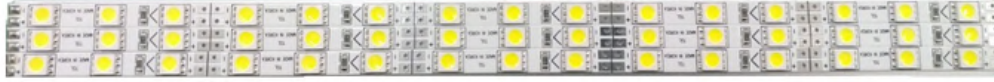
- This depends on what brightness you want at the front of the screen but with transparency at around 15-20% to achieve 300cd you will need around 1500cd etc. But with the new high bright white LEDs this is not a problem and not that expensive.

7) How much lighting do we need in our showcase box behind the display to create a good crisp image?

- This will depend largely on the size of the showcase box you are using / designing as well as the level of ambient light where the transparent display will be installed.

8) Where can we source the lighting for our own showcase Housings?

- You can purchase your own white hibrite LED backlights, but we can also supply you with our LED backlight strips (see below) which are what we use in our own showcase solutions. These need to be powered separately to the transparent display and can be cut down.



9) What is the resolution of images?

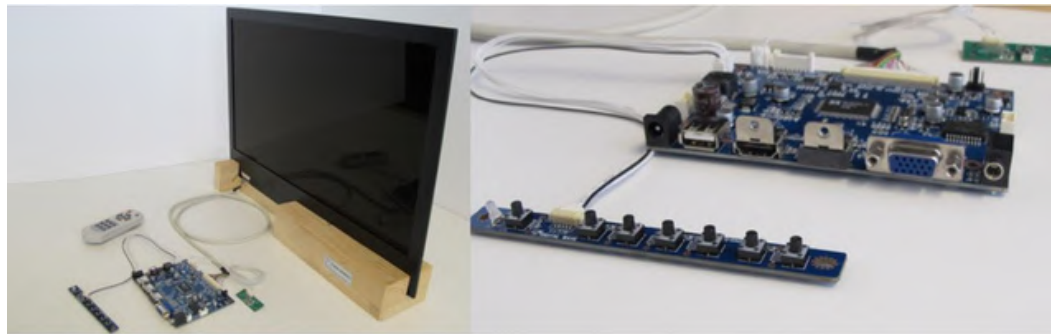
- Resolution (i.e. dots per inch) will depend on the display itself plus the content put onto the screen but as regards the actual number of pixels per display we offer anything up to 4K (3840 x 2160) on 65", 75", 86" and every display from 21.5" and above is now FULL HD 1920 x 1080.

10) How thin are the bezels on the Transparent Displays?

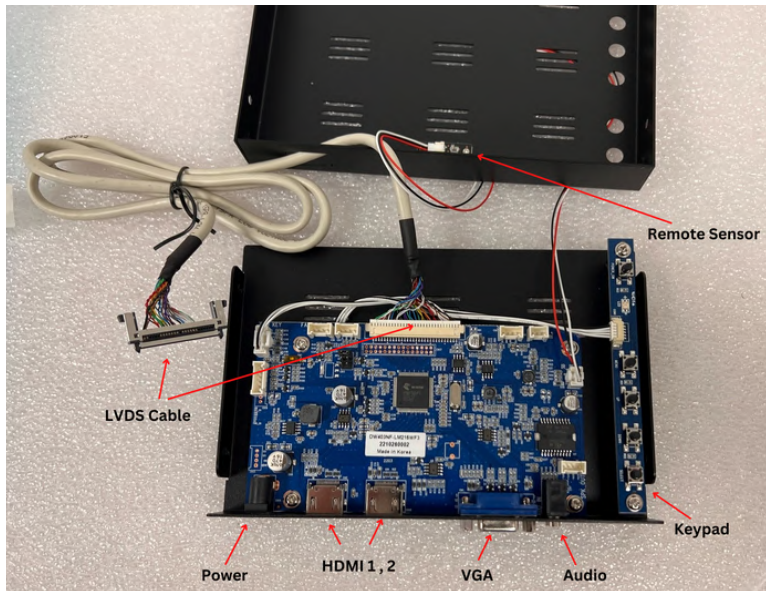
- The size of the bezels depends on the size of the displays as obviously the larger the display the bigger the bezel must be to ensure a strong and rigid structure. Often the bezels are offset to accommodate the drive electronics from the TFT LCD panel. There is one thicker side for the electronics which is on the long side for a landscape display, for a portrait model we can change this, so the electronics are on the short side. Please ask us for drawings.

11) How is the content updated?

- Our interface card solution (see below) gives you a kit that you can then use either VGA or HDMI inputs to connect your own choice of PC or media player. As you can see this offer a very flexible reliable solution for your application.



- We can also offer metal enclosure boxes for the media boards if needed;



12) Do the interface kits also have OSD boards and / or infra-red option?

- Yes, we have both as a part of the standard kit. Please see images of the components below.

13) How do we connect from the board to the Translucent Display?

- You simply connect via the LVDS cable into the display, which is supplied as a part of the CDS kit.

14) What file types can we use for content with your transparent kit solution?

- Our interface solutions offer several options for your content, with the most common being MPEG4 at a resolution of 1920 x 1080. But please contact us to receive a copy of the Interface card spec which includes all accepted file formats / codes etc.

15) Do I need a power supply for the Transparent Displays?

- The interface board comes as a part of the kit and this requires a custom 12 volt power supply but we supply this as a part of the kit so you have the complete kit solution.

16) Can they be updated remotely?

- Yes, they can by simply connecting your PC or media player to our kit solution via the HDMI input on the interface card provided. We can offer the full solution including a cloud-based Media player for a networked solution. For more information please go to [FULL HD Media Players](#).

17) Can you supply / add the power consumption for each transparent display? Reason is some co.s must log power consumption of all components in installs for museums for example etc?

- The interface board comes as a part of the kit and this requires a custom 12 volt power supply but we supply this as a part of the kit so you have the complete kit solution.

18) Can you supply / add the power consumption for each of your Touchscreens?

- The touch screens are powered by USB only, so they draw power from the USB port. Max 2.5Watts. The larger ones 65"+ use 2 USB ports (1 extra for additional power).

19) Is it possible to have lockable HDMI ports on our board(s) to aid potential loss of connectivity?

- Our standard media board you have received has a threaded nut positioned above the connector that can be used with lockable HDMI cables like this below. Alternatively, you can get HDMI cable with press clips as that will work also.

20) Is a touchscreen available?

- Yes, we strongly recommend PCAP touch overlays for transparent displays. We can offer touch overlays for integration, or we can also offer in-frame PCAP.
- For details of our standard touchscreen options please go to: <http://crystal-display.com/products/transparent-lcd/>

21) How many touch points?

- Currently we can offer up to 100 touch points (using PCAP touch foils) although we always recommend customers consider if they really need so many touches as this just adds to cost with often no benefits! Our standard Infrared and PCAP touch overlays have 10 points of touch.

22) What is MTBF rate on your panels?

- We do not have this information available, but we can confirm that the MTBF is very high since our transparent displays have no backlight and the backlight is traditionally the 'weakest link' in standard TFT LCD. Our transparent displays have shown the highest reliability and quality.

23) What are the temperature ranges?

- Standard operating temperatures are 0–50 degrees Celsius. If you need extended temperature versions, please ask our technical sales team for information / advice.

24) Is heat a problem within transparent showcases & what temperatures do they get to?

- Heat is normally not a problem as they produce very little heat themselves as they have no backlight and a simple connector box on the back incorporating a small PCB. They will only be affected by heat from the LED backlighting within a showcase box solution but as every application / design is different we cannot comment on those but just recommend that when our kits are designed into a boxed application that the temperature is measured to stay within the panel specification. Air vents can also be utilised for heat dissipation and ventilation if this is a concern. We recommend LED backlighting to help keep the heat to a minimum.

25) Can they be used in refrigerators / Coolers?

- Yes, in the past we have offered a range of transparent refrigerators, however due to the pitfalls with this technology we have decided to discontinue the range.

26) Can they be used in freezers?

- At the time of writing we have not found anyone achieve this in production due largely to the negative temperatures. It may not be impossible but would take some investment and testing to somehow build in and insulate the transparent display between 2 pieces of glass, so it is not negatively affected by the temperature of the freezers.

27) How would a touch interactive refrigerator work, does it work through glass or need to be layer on the outside?

- This can be done in several ways but the simplest would be to affix an infra-red touch screen to the outside of the refrigerator door with a PC built into the back and it could then work like any touch screen monitor. But we always ask the customer is this necessary and why would people touch a refrigerator? To get information? We always want applications to be practical and effective not just 'gimmicks'

28) The backside of some transparent displays is mirrored. Why is that?

- This is standard on all displays now as the mirror acts as a contrast enhancement film and increases the contrast and colour depth of the image, as well as maximises the light within the showcase, unlike some other displays. This mirror film can be removed at factory level for projects. We have done this for many customers as they feel the removal of the mirror film has increased the transparency for their projects and environments.

29) Will the transparency be as clear as a normal window or piece of glass?

- No, it will not and cannot be as the TFT LCD is made up of glass, a TFT LCD array (of RGB dots) plus polarizers all of which absorb light. Transparency is around 15% so one needs good brightness behind the display to ensure an excellent image. When the display is off it is a dark colour that is barely translucent so cannot be clearly seen through.

30) How do colours work with Transparent Displays?

- Basically, if you take the 2 extremes of black and white, black blocks out the light so nothing can be seen behind the screen whereas white becomes translucent so it is 'see through' and all those colours in-between become more or less transparent depending on how dark or light they are! So, for example dark blue or grey are not very translucent but light pink or pale blue are very translucent. This can be better appreciated if you think about a window and black = blindsdown and white = blindsup so you can see in the window. This is how you can make products inside your showcase box appear and disappear before your eyes!

31) Can it be used in shop/ store windows etc.?

- There is no reason why not, but it must have sufficient light behind the screen to counterbalance any light directly being shined onto the store window. As every window is different a site survey would have to be carried out as there is a big difference between say a south facing window in California and a side road in Moscow for example. Our experience with shop windows has made us consider such things as:
 - i. Position of window
 - ii. How much direct sunlight?
 - iii. Any reflections on the outside store window?
 - iv. Sufficient light behind the transparent screen?
 - v. Would it not be better placed inside the store as people enter the main doors etc?

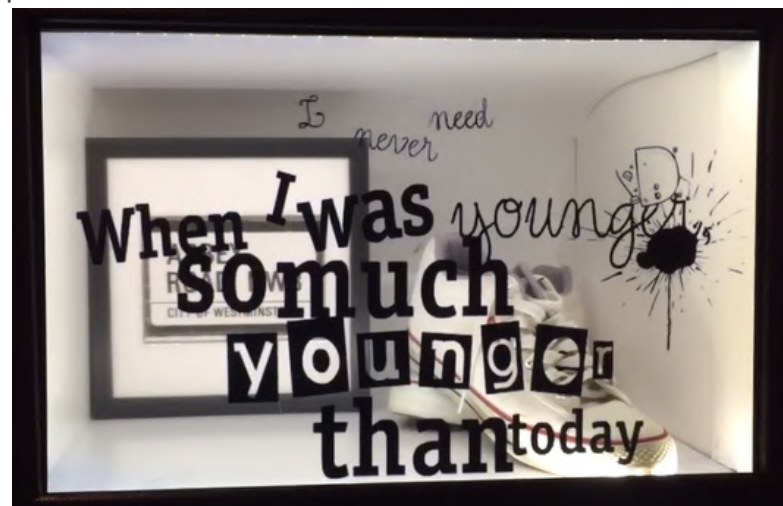
32) How are your transparent displays packaged for shipping?

- Due to the potential fragility of transparent displays, custom packaging is very important to us so we use custom boxes that are also suitable for International travel and freight forwarding. Clearly the exact box depends on the size and quantity, but you can see an examples here.



33) Can we show white content on a white background?

- Transparent LCD technology is effectively a filtering technology. It filters the light behind the display to create the image. The display is made up of pixels. When the pixels are 'White' they are effectively 'open' and therefore letting you see through the pixel.
- So effectively white is clear.
- In the below example the 'white colour' is fully open cell (i.e. Clear) and what you are actually seeing as white is the backdrop of the light box behind (Note there should be light box behind to get the best contrast and brightness).
- An off-white colour creates a shade as the pixels are slightly 'closed'
- The Dark black colours are full black, so the pixel is fully closed.



- In respect to your application, where you are trying to show white text on a white background. I am afraid this would not be possible.
- The only think we could suggest is that you outlined the white text/Graphic with a black outline;

OR USE BLACK TEXT ON A WHITE BACKGROUND

EXAMPLE OUTLINE TEXT

34) If I purchase a kit what else would my company need to supply to have a transparent showcase solution / product?

- You would only need to supply the white LED lighting and the box / cabinet, plus some content to show on the screen. That is all. We can supply you with some test content when you purchase a kit or showcase from us as a part of our customer service support system!

35) Do you have an overview of your transparent display sizes?

- Please see the table below but this is constantly changing as we add new displays to our range so we recommend regularly visit this webpage for [transparent displays](#) or sign up for our product updates.

PART NUMBER	DIAGONAL SIZE	RESOLUTION	DATASHEET DOWNLOAD
LCD-121-TRNV2	12.1"	800 x 600	Download
LCD-150-TRN	15"	1024 x 768	Download
LCD-190-TRN	19"	1280 x 1024	Download
LCD-215-TRN	21.5"	1920 x 1080	Download
LCD-230-TRN	23"	1920 x 1080	Download
LCD-240-TRN	24"	1920 x 1080	TBA
LCD-270-TRN	27"	1920 x 1080	Download
LCD-320-TRNV2	32"	1920 x 1080	Download
LCD-430-TRN	43"	1920 x 1080	Download
LCD-550-TRN	55"	1920 x 1080	Download
LCD-650-TRN	65"	3840 x 2160 (4K)	TBA
LCD-750-TRN-PL/X	75"	3840 x 2160 (4K)	Download
LCD-860-TRN/PL	86"	3840 x 2160 (4K)	Download

36) What are the smallest and largest sizes of transparent Displays that CDS offers?

- Currently the smallest standard is 12.1" diagonal (800 x 600 pixels) and the largest is the huge 86" (3840 x 2160). Sizes over 65" are optically bonded with a a protective and supportive cover glass due to the fragile and flexible nature.

37) Are the transparent panels manufactured by hand or by machine?

- They are manufactured in a factory in clean room conditions but also go through final human visual inspections as a part of the quality control process. Here you can see a video of the production facility;



37) Is there any capability to remotely control the power of the displays? I know they are low power consumption, but there are requirements from some customers to have the equipment turn off. Most would prefer to do this with RS-232 or a UDP/TCP command, but a low voltage relay would be an acceptable solution as well?

- If you are using the HDMI input on the boards, and the active signal is removed (i.e. PC power down etc.) then the Media board will switch off the display and go into sleep mode (<2Watts) until an active signal is re-acquired.

38) How do you recommend mounting the Transparent LCDs if we are designing and manufacturing our own Showcase using your Transparent kits?

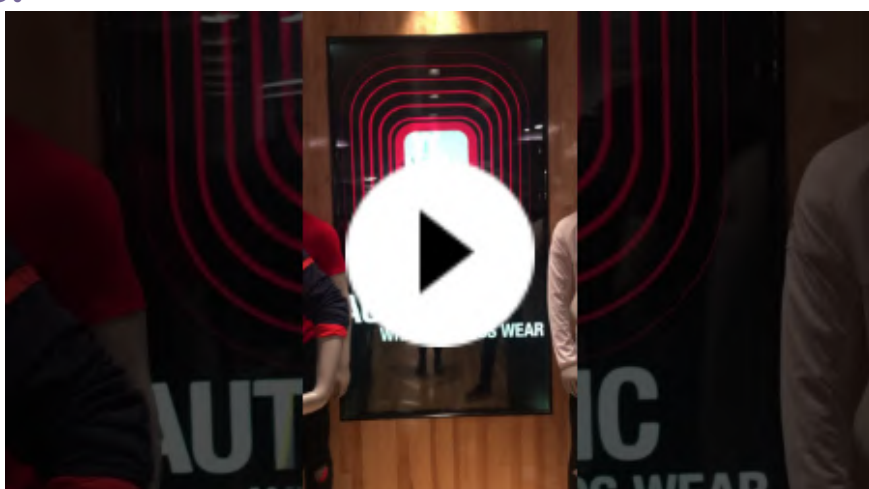
- Without knowing your specific project/ design it is difficult to comment exactly but we advise on all projects wherever and whenever we are needed. As a general statement: For the transparent showcases we suggest the unit is mounted in a recess or aperture with metal clamps holding it in place around the edges of the metal frame, and additionally support holding the weight of the unit from below (e.g. a metal L bracket). Additionally, you can utilise the screw holes on the side of the Transparent display frames which help with mounting and design.

39) I used a Samsung 22" and 46" Transparent display and then an LG 26" and they were made quite quickly obsolete / End of Life (EOL) which caused us problems, what can CDS do to help avoid this?

- Base panels do inevitably go end of life but CDS controls the mechanical design of the bezel frames so we can offer longer term availability and potentially use alternative panels within the same mechanical footprint so the user still has a Form Fit and Function (FFF) solution, to help our customers maintain their own products and solutions in the field as well as support any spares or repairs requirements.

40) Due to the viewing angles how good are CDS Transparent displays when used in portrait (tall or long) mode?

- Due to the high-quality panels used by CDS with ultra-wide viewing angles on all axes as well as the high colour Gamut of each panel the CDS Transparent panels and solutions look excellent when in the field. BUT do not take our work for it, please see the example of our 84" 4K display used in portrait mode below at the Nike store on 5th Avenue in New York City.



41) Can they be used for a videowall?

- Yes they can like any other standard display BUT due to the bezel structure you will not be able to achieve a Super Narrow Bezel (SNB) solution as is possible with other displays that are specifically designed for that purpose as you can see here - Click here for [videowalls](#). If a transparent videowall is needed it may be best to opt for a T-OLED videowall. See more here - <http://crystal-display.com/staggering-transparent-oled-videowalls/>



42) Can you supply drawings of just the glass with mechanical, viewing area and active area on them? This is, for example, if we want to make our own frames such as for example the 2 x 2 Videowall with the 2 displays turned 180 degrees to minimise the frame.

- Yes, we can supply this upon request and just need to know which display and we will email that through.
- Please note, the warranty is void when removing the displays from the aluminium frames that we supply.

43) What makes our technology better compared to others?

- CDS offer the latest transparent technology maximising transparency whilst utilising high quality base panels to ensure viewing angles and the colour gamut is optimized, resulting in the best panel and solution performance. But we say simply try our technology and you will not be disappointed. Plus, we are constantly expanding our range to help offer the right solution for every application where possible, which now includes FULL HD 1920 x 1080 resolution as well as Ultra HD 4K (3840x 2160) resolution in a few of our larger models. See more at the end of this document.

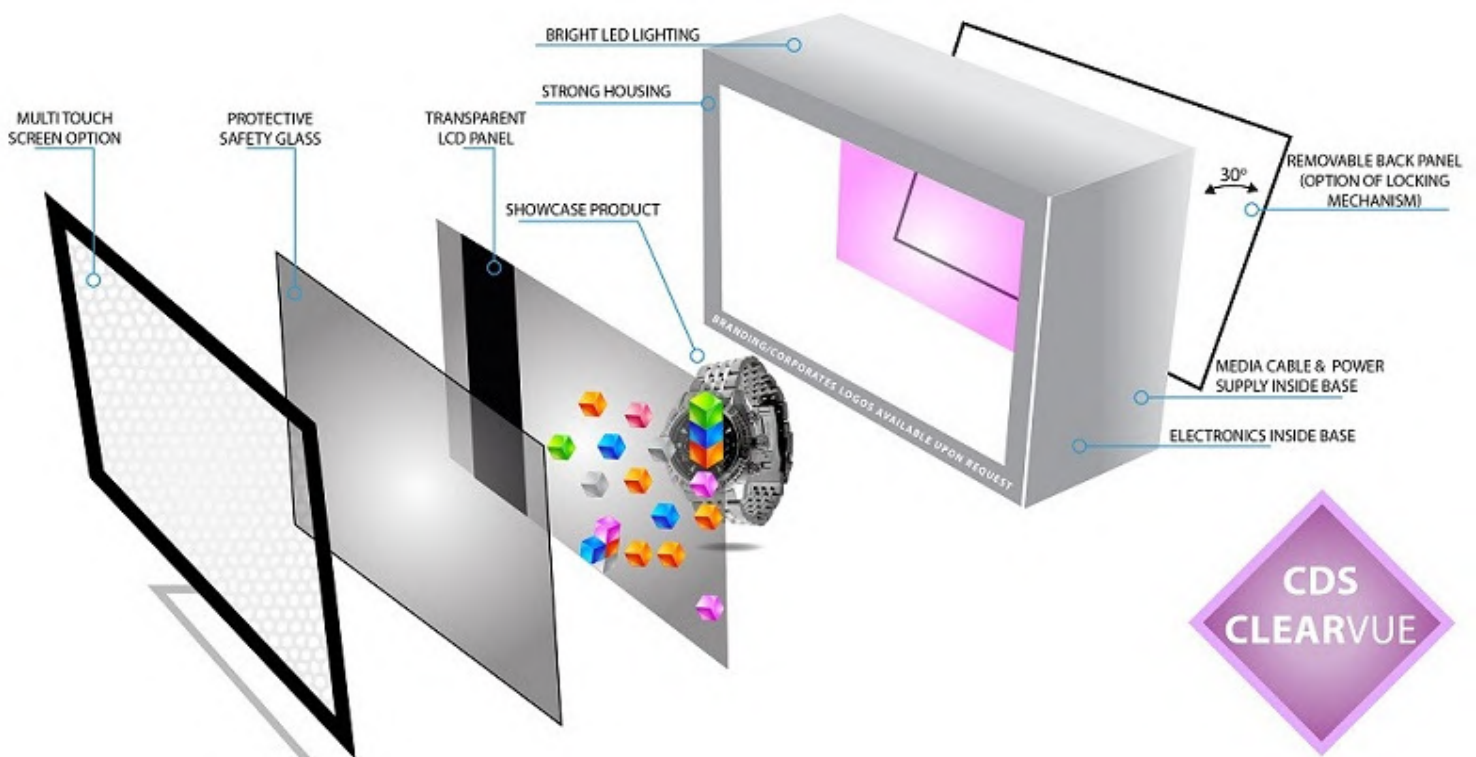
Transparent LCD Showcase Boxes

44) On your showcase show is the front made up if it includes touch screen?

- We have the showcase box, LCD transparent panel, multi touch screen which acts also as a protective outer layer. If there is no touch, then a protective glass is put in place. For more rugged applications it may be possible to have a projected capacitive touch screen and have a sacrificial layer, but this would very rarely be required.

45) We have never seen a Transparent Showcase (only in videos) so could you show us how it is constructed, also with Touchscreen?

- Please see the following rendered images that may help:



46) How do we replace the items / contents inside your showcase products?

- The access panel is located on the back of the unit. You can manually open and completely remove it. For safety reasons, it is also possible to lock the panel with the keys provided.

47) Can we use and fit our own PC or Media player inside or with your Transparent ClearVue showcases?

- Our standard offering is fitted with HDMI inputs, which can be used for you to connect your own player. You can also use your own PC if required, no problem at all, and many of our clients have.

48) Are your ClearVue showcases always supplied with a protective front glass?

- Yes, they are, whether that be a non-touch unit or in fact a touchscreen solution where a protective glass is used in front of the touchscreen or as a part of the Touchscreen panel to give excellent optical performance, stability, and reliability.

49) What backlighting do you use or recommend for showcases?

- The standard LEDs we use are 6000Kcool/daylight white. They are fixed on and non-dimmable.

50) Is the lighting dimmable in the showcases?

- Dimming could be achievable, but we would need to know how you would want to control the dimming?

51) Can the transparent showcases be used for old artefacts such as museum pieces?

- Transparent display showcases have been used for museums, but this must be looked at on a case-by-case basis, especially with very old artefacts as to how they are affected by such conditions, especially light. Most museums have their own or knowledge of experts on light etc. to ensure such artefacts are not damaged or negatively affected. [Please see an interesting case study here.](#)











52) What benefits do your transparent panels, kits and showcases offer?

- Please see some of our benefits on the right but hopefully this document demonstrates the knowledge and expertise we have built up over several years which can benefit our clients. We have been involved with many designs and applications all over the world and this experience is invaluable when supporting all our global as well as local customers!

53) What advantages does the CDS showcase range offer over other suppliers?

- CDS offers a number of different sizes from 12" up to 43". We have several various designs of cases and materials, so our clients get the best solution for their project, as well as the option of custom designs that meet exactly what our client's need. We focus on quality, flexibility of design and the product range.

Top 10 Advantages of CDS ClearVUE Transparent Showcases

 WOW FACTOR GUARANTEED The physical product is enhanced by the transparent screen and the amazing translucent screen thrills its viewers.	 AMAZING TRANSPARENCY Based on the latest state of the art LCD screen technology, Full HD resolution with clarity and optimised translucence.
 AUGMENTED REALITY EFFECT A translucent effect digital layer for images and video content when combined with real physical products inside the ClearVue showcase give that AR effect.	 HIGH RESOLUTION IMAGES WITH VIBRANT COLOURS With our high Contrast Technology, the screen image is shown in vibrant colours and definitions.
 HIGH QUALITY MANUFACTURE The excellent construction is made from light-weight metal and finished by a white matt powder coating, resulting in a beautiful look and feel in any environment.	 SIMPLE ALL-IN-ONE SOLUTION With our integrated media player, the content can be played from a USB stick automatically after switching on the CDS ClearVue Showcases.
 SIMPLE PLUG'N'PLAY The ClearVue Showcase can be connected to your PC, Mac or Media player like any normal monitor to create that WOW Factor.	 SLEEK DESIGN Designed by the CDS Team, ClearVue showcases achieve an exceptional translucent showcase box.
 CUSTOMIZATION Fully flexible and customisable to meet your requirements including Size, Colour, Corporate Logos, Shape, Touch screen etc.	 FAST DELIVERY Rapid response and options to meet your needs today.

CDS
CLEARVUE TRANSPARENT SHOWCASES

54) If we want to purchase a ClearVue showcase for rental and / or exhibition use how can you help us if the wooden crates are not sufficient?

- We can supply your ClearVue showcases in a custom designed and fitted Flight case or flight cases to help ensure safe delivery and protection going forward. We appreciate these are important assets for you and our clients and so need protection in transit.

55) Where can I see some of your Transparent Displays or videos of them?

- At different times there are different sizes and designs on show throughout the world, but this is constantly changing so best ask when you want to see something. You are also more than welcome to come and visit our office. Alternatively, you can go to our Youtube channel and you can see multiple transparent displays there. www.youtube.com/crystaldisplay/

Have you seen
our
transparent
case studies?



More Options

56) Are Transparent OLED displays back?

- Yes, they are and with vengeance! We have a whole new range of T-OLED available! This is a completely different technology to transparent LCD, it emits light and opposite to transparent LCD cannot show black content (black is off) and can show white.
- Please visit our webpage for more information - <http://crystal-display.com/products/cds-transparent-oled/>



57) Is there another option for backlighting the transparent LCD without a showcase box and LED light bars?

- Here at CDS we offer a 3DP solution. This consists of backlighting the transparent LCD with a high brightness LCD display at the rear. We match the polarisers for the two displays to create a 3D effect. The high brightness rear displays are offered in open frame solutions with in-built fans for heat control and protective glass and touch overlays can be added as normal for the front transparent LCD. See more here - <http://crystal-display.com/products/transparent-3dp-displays/>

58) Do you offer ultra-wide stretched displays as transparent displays also?

- Yes, we can offer certain stretched LCD displays as transparent solutions. It would be best to pick a native stretched LCD (non-cut). As the lead time for cutting displays would be anything between 5-11 weeks to manufacture and then re-manufacturing to make transparent takes a further 5 weeks. For the latest information please click here: [Transparent bar types](#)



Finally, some advantages of our Transparent solutions include:

- Longer term availability as we design and manufacture the metal frames so even if the original panel goes obsolete, we can use a new panel within the SAME mechanical dimensions.
- High reliability interface solution has VGA, HDMI as well as simple USB inputs to give flexibility
- IR and PCAP Touch screen options for all Transparent panels
- With longer term availability spares and repairs are much more practical
- We specialise in long term availability of Transparent (Translucent) displays unlike Samsung or LG that see them as a technology demonstrator and not a long-term product as the market volumes they desire are not there!
- Standard and Custom transparent showcase boxes
- In our experience, our transparent product is better (transparency, colour gamut, viewing angle etc.) and much more reliable plus we supply it with a solid metal frame for stability and reduction of potential damage during transport and installation.
- We hold stock in the UK for quick response and for the right partners can offer credit facilities via HSBC invoice finance.
- Also, we supply our displays with industrial grade electronics and cables to ensure reliability and quality.
- Plus, if you have any problem with the product, we can fully support you and troubleshoot (over the phone or email) if required including spare cables, boards etc. if needed. This is all a part of our overall solution support.
- Then of course if any issues cannot be resolved this way then they can be sent to us for repair.
- We offer a high-quality product, longer term availability and reliability with full after sales service.
- It is our understanding that many partners make you sign strict contracts, we have no MOQs, excellent support, spare parts stocked, and no contracts need to be signed. The reason for this is we know that our products and support are excellent, and we know customers / partners will stay with us and we do not need legal contracts as if you are not happy with us or our products you can simply go elsewhere, but our customers stay with us.
- Our customers have access to our team 11 hours a day via the phone and 18 hours via email support to allow for any time difference issues.
- If you are looking for a supplier, then you can choose anyone but if you are looking for a long-term partner then CDS is the best choice.

Need any additional information?

If you need any assistance with pricing information, technical support or require any additional information our team would be more than happy to assist



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DISPLAY, TOUCH AND DIGITAL SIGNAGE SOLUTIONS**

E&OE - Specifications may be subject to change without prior notice