ONE WORLD LED

LED DESIGN, MANUFACTURE & WHOLESALE

- Design, Selection, Purchase, Installation and Support of LED Display Screens
- Including Adverpost

COMPREHENSIVE LED HANDBOOK

Version 4.0

Price $59.00 USD

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One World LED

LED Screen Selection, Installation and Support

HANDBOOK

Version 4.0

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Acknowledgements

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Please contact us at One World LED for any additional topics you wish to be added or for any correction, addition or deletion that you need in order to help us keep this information accurate and up to date.

Preface

LED Screen technologies have made significant strides in the past decade with the introduction of the Flash Module Array Systems innovations. These innovations have advanced application of LED screens a quantum leap forward from receive only devices into two way public communication tools. The two-way multiparty transaction capability has brought the virtual commerce using 4th screens within grasp.

This means LED Screens are no longer limited to part time entertainment applications such as scoreboards and digital advertising billboards and concert backdrops. In fact, LED screens are becoming an architecturally integrated systems for the building façades in modern malls, highways, airports and public squares.

Other innovations have expanded application of LED screens into a public media and interaction by incorporating mesh, curtain, glass and other medium for communicating messages and information to the public and marketplace.

For more in depth study and evaluation of these exciting new innovations and technologies please refer to One World LED Architecture Primer and the One World LED Design Primer documents.

This handbook primarily discusses the new Flash Module Array Systems (FMAS) based screens that are modular. A new section has been added to explain V-Commerce and compare its architectural innovations to that of the E-Commerce and digital advertising of the prior art.

Chapter 1 – Selection and Installation

Introduction

This handbook is prepared by One World LED and One World Technology of Suzhou to help your understanding of LED display products and technologies. This handbook will help you learn about the full colour LED display product specification, selection, installation and operation.

You will also learn about the various options, features and functions of full colour LED displays and billboards in single and multi-user applications as well as correct methods of deployment (application and contents development and management).

This handbook covers the following material,

LED Selection Factors
LED Supplier Selection
Check-lists and safety notes
LED parts and sub-assemblies
LED Installation Notes
Hardware and Software installation
LED Service and Common Issues
LED Video Production Notes

We hope this handbook provides a simple overall planning, selection, installation, care and support information. This is intended to help you in moving your business's marketing and advertising forward into digital age. This provides you a path to full utilisation of coming Virtualisation and visualisation technologies that are destined to move the marketing and sales methods a quantum leap forward. We at One World anticipate digital advertising to revolutionise the sales and marketing and put the hi-tech SMEs on equal footing with multinational corporations.

Selecting Correct LED

Depending on the intended application user needs to consider the following options to build the correct criteria for specifying the LED products.

The factors to be considered in determining which LED display product best suits your application needs should include at least the following,

Architecture – Daktronics or One World

Design – Integrated, modular, curtain, mesh, glass, flat or curved

Screen Type – Indoor, Outdoor, Semi-outdoor (in metal or aluminium)

Form and Shape – Cabinet, Frame, Die-Cast, Curtain, Flat/Curved

Serviceability - Front or back Serviced

Pitch and Size – Pixels/square meter, led brightness, size (HxW)

Direction – East/West or North/South (brightness control)

Mode of operation – Synch, Asynch or both

Colour – Single, Dual or Full Colour

Sound – Real time broadcast support

System and Software – Platform OS, Setup and Contents Management

Networked – in coordination with other systems, displays or stand alone

Control – Central Control, Field Control, Remote Control, Combinations

These and many other factors such as component configuration and power consumption/backup are described in more details in Appendix 2 of this Handbook.

Large LED screens and billboards represent a significant capital investment. As a result, the contents management should be a paramount consideration as the financial results of LED screen operations mostly depends on the proper contents management strategy and systems.

Selecting Your LED supplier

Your selected digital screen represents your image and communicates your message to your target market and community. Selecting a technology leader as your supplier combined with local service and support gives you the best in product and service. One World architecture has rapidly eliminated all major competitors and has been established as a de facto standard for major LED projects.

Full Colour LED signs and billboards represent a major capital investment which is made to advertise, market and display your most important business assets to your clients, namely your name and products or service. It is then critically important to make sure this investment serves its intended purpose today as well adapting to the changing technology and market needs properly. This means a reliable and high quality LED display can introduce your business to your market and clients, changes your message in time to deliver timely information and helps inspire and build your customers trust in your organisation, products and services. Following is a list of key factors to consider;

Manufacturer, and manufacturer's qualification and expertise
Name and brand of LED product and the patents that protect it
Manufacturer's investment in technology, design and development
Manufacturer's commitment to design, manufacturing and support
Manufacturer's commitment to providing trusted local service
Manufacturer's technology partners
Qualified and certified local resellers network

By producing this important manual, One World LED hopes that you will not only consider the technology and the product but also our long-term commitments. Commitments to the technology that we have innovated, pioneered and continue to

play a substantial role to advance[1] to best serve your business needs by creating technology and products that present winning options for our clients and our client's clients and our industry.

Additionally, One World LED commitment is to supply products only through most reputable local sign companies and wholesalers that complete our training and certification with annual reviews. This ensures that your LED will always enjoy most qualified service for support, expansion and upgrade as needed.

Warning - *purchasing unlicensed, pirated and illegally copied and produced products such as LED displays usually result in quality and service problems. It can also make resellers and installers liable for IP rights violations of those whose intellectual properties are violated or converted by illegal acts and piracy.*

Remember the old adage: “you get what you pay for”. However, in this case you may get much less than what you pay for! Ignoring proper systems or contents management solutions to save money can prevent you from getting optimum results.

One World LED Cost Considerations

One World LED products are available through a network of established resellers that understand local market needs and development compliance issues. The off-the-shelf One World LED products are priced on per square meter basis most competitively with respect to other high-quality name brand products. However, your final LED system and solution costs which may include design, engineering, planning, approval, power savings, HVAC, shipping, handling, insurance, construction, installation and Internet marketing/listing will vary. This variation also includes currency fluctuations, labour cost premiums and government licensing requirements.

Following sections detail key cost and pricing issues to enable an apple to apple comparison between various LED products and suppliers.

What should an LED screen or LED display cost?

The purchase cost of LED screens[2], LED displays or electronic billboards depends consist of A) LED screen and B) the LED system (including installation and operation). The former depends on three key variables. Those three variables are the 1) total size of the LED screen, 2) the pixel resolution of the LED screen and, 3) the brightness of pixels.

1. **The total size of the LED screen**: The bigger or larger the LED screen the higher the cost for similar LED screens. The prices are based on per square meter, which means that if the total size is N square meters, the price will be N multiplied by the cost per SQM.

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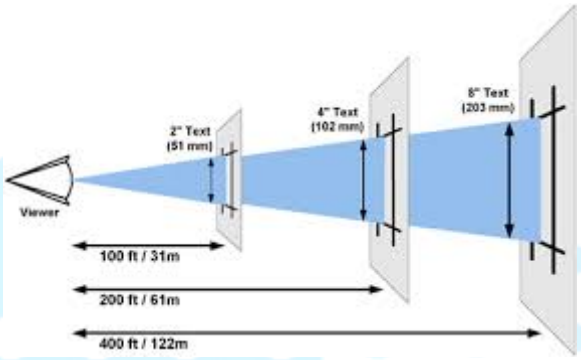
1 Please refer to the One World LED's list of patents and innovation awards partially produced on the website. We currently have numerous other patents pending globally that we will b able to produce confidentially for prospective resellers review.

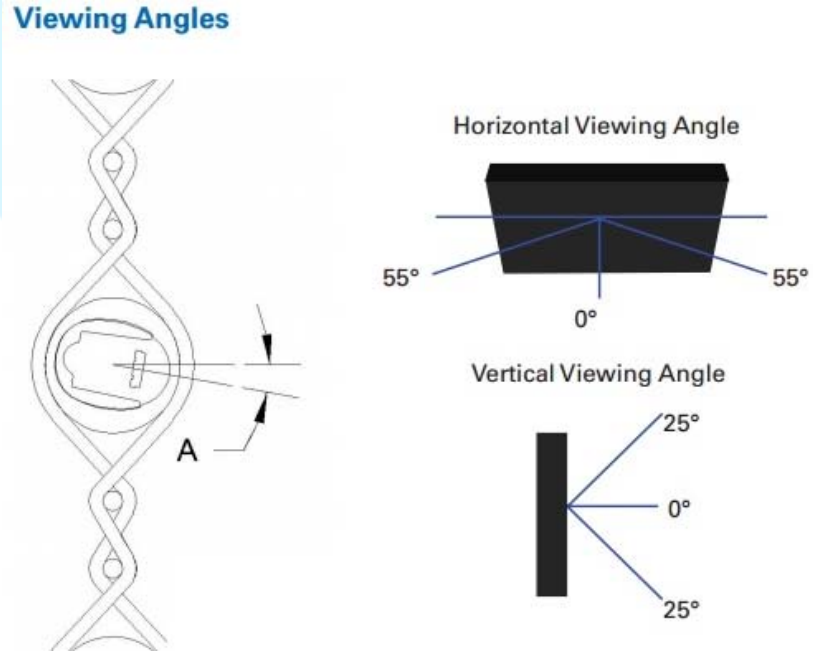
2 Assuming the type as indoor, semi-outdoor or outdoor is determined.

2. **The pixel resolution of the screen**: The more pixels, or the more number of LED´s, the screen has the higher the cost will be. For example if a screen is 12sqm and has 49,000 pixels, it will be cheaper if the LED screen is 12sqm with 120,000 pixels. This is because more LED lamps will be placed onto the screen which is a higher cost. But on the other hand the more LED´s the screen has, the higher the detail will be of the videos and images that the LED screen will be publishing.



Size of Message vs. Viewing Distance Diagram

3. **The brightness or contrast** – while the size and resolution determine the viewable pixel matrix and granularity of the image displayed it is the lighting contrast of LED screen with its environmental backdrop that determines the viability of displayed image. For example, a larger P10 SMD semi-outdoor LED screen of low brightness may be washed in sunlight and not be as viewable in any range compared to a brighter and smaller P8 DIP Led screen.
4. **Angles of View** – Vertical and Horizontal angels of view are depicted below (Source: GDK).



Vertical and Horizontal Angels of View

A brighter screen with lighting control will save on power consumption and provide best viewable and visible image and may cost more to purchase but will cost far less to own due to operating expense and life-expectancy (replacement cycle).

The cost of ownership of LED screens is the sum of purchase and installation/operation costs of the LED over its life-cycle (less the revenue it generates). Of the two costs the cost of ownership is a more important factor than the cost of purchase. In reality, it is the capital expenditure or the budget that usually becomes the deciding factor for in-experienced users.

It is important to note that in any circumstance there is only one “best solution” as compared to many cheap or inexpensive options. The best solution takes into account not only the costs but also the revenue potential and measures the impact on the business.

However, the most important factor in successfully communicating a message to the market using LED screen is the quality of creative work, graphic and clarity of contents in relation to LED screen electronics design and image processing capabilities.

LED System Cost Justification

LED systems costs are justified on two bases, application needs, income or revenue increase. Following is a typical LED System cost justification based on revenue impact.

LED SYSTEM
Cost Justification Worksheet

Using Daily Traffic Count Study

1. The average daily traffic past my location is: _____ vehicles per day.
2. The ads I run on my LED display should attract _____ percent of that daily traffic or _____ customers per day.
3. My average customer order amount is $ _____.
4. Multiply the number of customers per day by your average customer order amount for example: 5 customers per day X $100 average customer order = $500 per day
5. Multiply line 4 by the number of days your location is open per year for example: $500 X 260 days open per year = $130,000 per year. Write that total here: $_____
6. The total cost of the LED display system is $_____.

Other revenue impact bases may include venue and advertising contract agreement that can be used to justify the amortized LED system cost over its ownership term.

Single, Multi-Colour and Full Colour LED Displays

There is a significant difference between single or multi-colour text and full colour LED displays. Consequently, the text based LED displays are of limited use and costs and constitute consumable product with little or no investment value. On the other hand, full colour, full featured LED displays are used for large screen indoor and outdoor displays and billboards and constitute capital investments which must deliver value and/or income to their owners.

As a result, One World LED has produced this handbook primarily dedicated to information on full colour LED products and technologies.

Full Colour Video LED Signs and Your Business

One World full colour RGB LED Signs are the latest breakthrough development in on-premises advertising and virtual selling.

One World full colour LED Signs give you the ability to advertise your products and services using graphics, text, images or video right in front of your business where thousands of people pass by every single day.

A Major Australian Mall LED Using One World Control and Adverpost

You have heard the expression "a picture is worth a thousand words". One World full colour LED Systems give you the ability to communicate with imagery - the most

powerful form of communication in the world and soon to sell to your customers rather than just informing the market and your competitors.

Unlike Monochrome LED Signs that use only one color of LED light, One World LED Systems utilize three different colours of Light Emitting Diodes (LEDs). The three colors used are Red, Green and Blue. Each individual LED can be operated at different intensity levels to create over 500 Trillion colours of light.

For example, a 4' X 8' full-colour LED sign will typically cost double that of a 4' X 8' Monochrome LED Sign. In addition to using three different colors of LED's to create the wide array of colour, the LED's in a full colour LED Display must be positioned much closer together.

Moving the LED's closer together means more LED's must be used in a full colour LED Sign than in a Monochrome LED Sign. The use of additional LED's also contributes to the increased cost over the price of single and dual colour signs. However, the One World patented technologies and volume productions significantly reduce the development and production costs while improving the potential of the full colour LED systems. Consequently, the One World LED advantages in many cases has dropped the full colour costs to the same or lower levels than many single and multi-colour products.

Another key advantage of full colour LEDs over mono and dual is future compatibility with video and multimedia files and advertising platforms because they incorporate more sophisticated control systems such as Colorlight Control Systems.

Notices and Checklists

This section includes typical One World LED product safety checks and installation checklists.

Safety Notice

1. Please read all instructions before unpacking and using the LED products.
2. Keep all manuals and instructions for future reference.
3. Please use only accessories supplied or recommended by the One World LED.
4. One World LED products use GFI power. Make sure licensed electricians install grounded outlets and wiring as specified for use with One World LED.
5. Make sure the product is supplied through a certified and accredited reseller.
6. Make sure the power outlets supply the maximum specified sum of the products.
7. Do not overload circuits and outlets and or wirings.
8. Pay attention to all warnings and notes in the manuals.
9. For maintenance and service first turn off the power then call for service.
10. Do not defer scheduled maintenance or service.
11. Prevent water penetration into the cabinets and electronic housings.
12. Maintain all cooling systems and fans in good and running conditions.
13. Avoid leaning ladders into and on the cabinets or striking the equipment.
14. Turn the power off in severe storm and prevent lightening and debris strike or damage.
15. Keep communication and high voltage lines in separate, approved and designated conduits.
16. Avoid lifting cabinets manually during installations or service.
17. Make sure the equipment operates within the safe temperature range specified for proper operation.

Installation and Operation Check List

After developing the installation plans that must include location, power and data connections for the server and other components of the system, it is important to develop a checklist to ensure smooth installation and problem free operation. Following is a list of factors to consider for best results in an LED Installation and operation process.

1. Check the supporting structures and frames before installation for construction quality and integrity to ensure it can support the LED system in all operating conditions and environments such as high temperatures, winds and storms.
2. Pay careful attention to the first row of the cabinets levelling and security to prevent creation of gaps and distortions in facing of the LED screen and in building higher rows.
3. Before turning power on, make sure all the power and data cables are connected correctly. Test the large LED screens one section at a time during the initial power up and testing.
4. Make sure data cables are not touching the the power cable s and communication options used meets the distance and connectivity requirements of the site.
5. Make sure the computer is turned on first and then turn on the LED Screen and make sure computer detects the LED screen and data connection is established.

6. Turn off in the opposite sequence by turning the LED screen off before the system.
7. Make sure water cannot enter the electronics and power supply housing of LED.
8. Make sure corrosive chemicals do not enter the air circulation system of LED cabinet
9. In case of water penetration or harsh storms make sure the electronics are completely dry before turning back on.
10. Make sure the heat generated can be exhausted per design and the system operates within prescribed temperature limits to prevent premature failure of electronic components.
11. Do not operate the LED at full brightness for extended periods of time. The heat generated at full brightness can impact the longevity of the LED components and lights.
12. Turn off the LED billboards in severe weather to prevent lightening damage.
13. Set up the preventative maintenance schedules to check the power system and the heat dissipation (fans, HVAC, Cooling) to ensure proper operating environment is maintained.
14. Make sure the LED screen parameter settings are in compliance with manufacturer recommended settings for optimum operation and colour/image production.
15. Periodically review the spare parts inventory to make sure sufficient parts on hand to address service issues.
16. For the best results make sure the contents are especially designed for the LED displays with the proper attributes.
17. For major installations make sure a multi-function card is installed and tested to automate power-up/down and monitoring as well as energy management, lighting control, security, problem reporting and remote voice and text notifications.

Note: *Most video contents such as Youtube videos and advertisements are designed for print and backlit LCD monitors and TV's (with white background). These videos are not energy efficient and will not look as good as professionally created videos especially produced for LED screens with black (dark) background which utilize attention getting aspects and stimulants. Please refer to One World LED Contents Design primer for more hints and details.*

Professionally prepared LED Videos do not use white backgrounds as this will maximise power consumption, heat generation, irritation of viewers while reducing life-expectancy and real-life imaging. These videos use only 1/10 of second white flash such as used in Dior (J'ador) or Pepsi commercials. These videos use camera flash which is highly attractive in getting viewers' attention to the context that is mostly darker backgrounds with bright and colourful highlights to retain viewer attention while delivering the advertising contents or product's message.

Packaging and Shipping Problems and Pitfalls

The cost of LED projects normally overshadows the packaging, handling, shipping, insurance and storage costs. However, in some cases the delays in the design and manufacturing due to change orders may result in the need to expedite the shipping of the screens, frames and structures. This can easily become a significant part of the project cost due to weight, size and mode of shipment required. DHL, UPS and other airfreight methods can easily cost thousands of dollars thus blowing out the project budgets.

Following are the two common modes of packing LED screen and parts for overseas and

long distance shipping.

International Shipping Options

Wooden Case Package

Flight Case Package

The flight case packing can add $50 to $100 (USD) per square meter to the cost of packaging LED screen cabinets. This additional cost I swell worth it as can save significant time and costs and prevent troubles of repairs for the rental screens used for temporary installations such as exhibitions, concerts, campaigns, fashion shows and other rental opportunities.

Subassembly Issues and Instructions

The One World LED display systems are one embodiment of Flash Module Array Systems. These systems consist of a number of flash modules that can be programmed to map pixels data from their flash memory to upstream LED modules (SMD or Dip lights) in a coordinated manner to render text, pictures and videos. Each flash module can act as an independent receiving card for all the LED modules that are connected to its as upstream devices. Together the Flash Module Array System with LED modules, power supplies enclosed in one or more cabinets produce the LED display screen

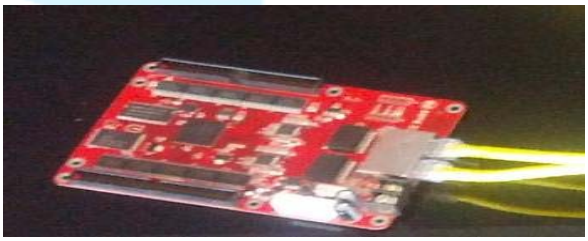
There are two basic cabinet construction methods, custom and standard. Custom configurations are used to make various portable, car-top, bus-side, rental, curved and or fixed-frame and, showroom units. On the other hand, standard cabinet configurations are used to create expandable and very large display screens and billboards for indoor, semi-outdoor and outdoor applications.

A One World LED Car-top unit

And a Custom LED Billboard

There are other sub-assemblies and parts that comprise an LED cabinet and a set of cabinets are organised to create an LED Screen or billboard. An LED Cabinet is comprised of Flash-based Module Controller, optional hub, Led modules, Power Supplies and fans. These components are described in more details in this section.

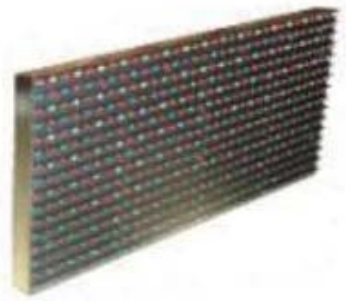
- The Flash-based Module controller is the key component of LED cabinets and frames. This component is also referred to as Receiving Module or Receiving Card. The Receiving Cards may implement different methods of controlling or mapping the received or pre-stored data in their flash memory to the LED modules connected to them with or without a HUB.



Flash Module Controller, or “Receiving Card” (Synch or Asynch)

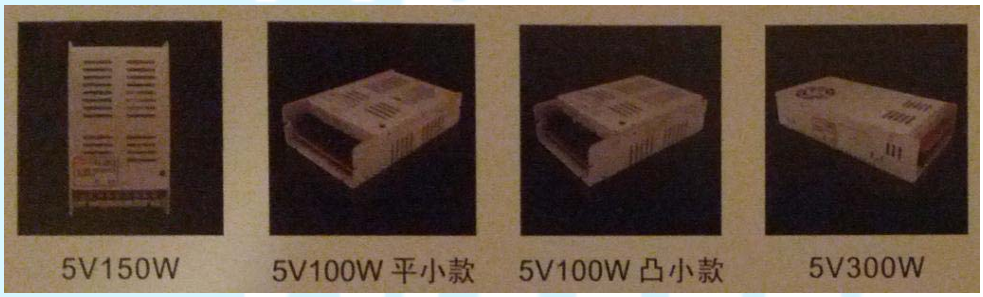
- The LED module is the most basic unit and the display component of the LED screens. Below are the pictures and components of the LED

modules.



LED Module- Front Side **LED Module-Back Side**

- The Power Supplies (P.S.) are next most important components of LED displays. Below are some examples of LED Power Supplies.



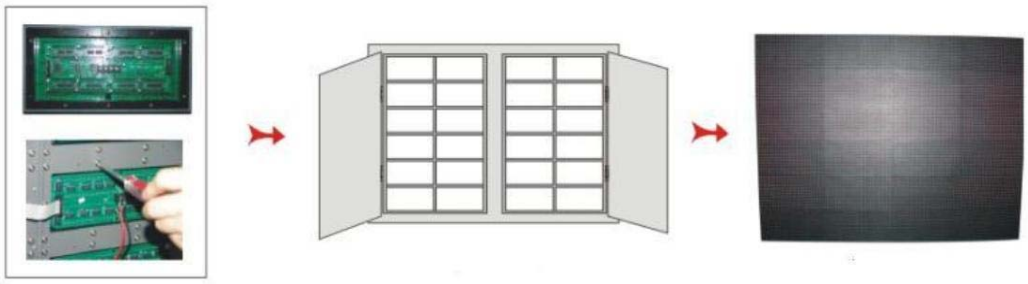
LED 5V Power Supplies range from 12W to over 300W

Following picture shows a typical One World LED power supply inside a cabinet.

High Quality 5V Power Supply with Aluminium Frame

It is very important to have the right power supply in the design as majority of LED power supplies manufactured by Chuabglian or SZKGDY and sold under many other OEM brands are very reliable. However designs that overdrive the power supplies and operate at temperatures outside the specified ranges will shorten the life of power supplies and cause premature failures and damage to other parts. Another factor impacting reliability is the use of Cheap fans that fail or do not exhaust efficiently.

- The Cabinet that forms the basic unit of LED display screen. There many different types and sizes of cabinets.

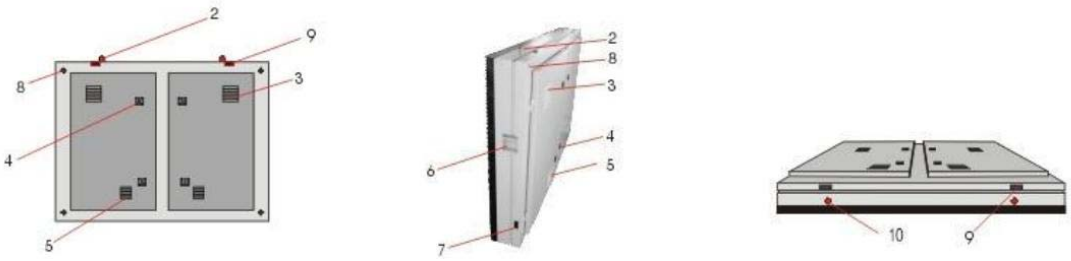


LED Cabinet, Mounting frames and LED Modules

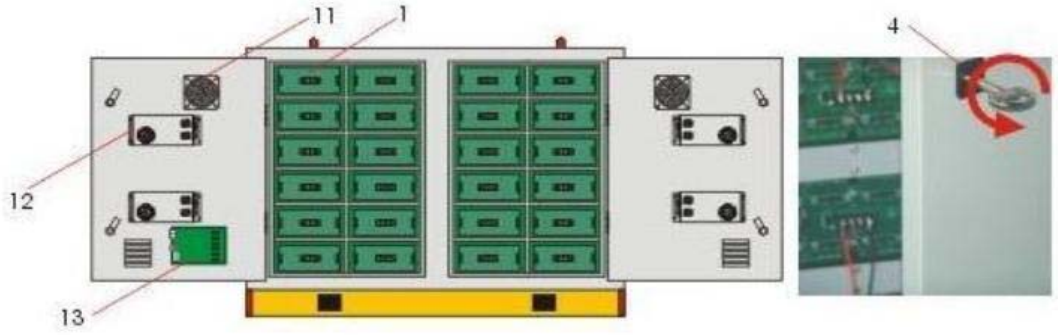
The cabinets are the basic building blocks forming a large LED display screen or billboard. The coordinated set of Flash Modules that control the cabinets is a Flash Module Array System or FMAS. Multiple FMAS may be used to construct multi-side screens or very large display walls. Refer to the design consideration section for more details.

Following diagram details the LED cabinets parts breakdown and list.

1. LED Module – different pitch and type have different dimensions
2. Fixed LED Module-Mounting frames matching LED Module dimensions
3. Fan Grill and vent
4. Door Lock
5. Air vent (intake)
6. Handle
7. Power and Network cabinet connections (side links)
8. Bolt holes for cabinet mounting to build multi-cabinet display
9. Power or data network connection (bottom links)
10. Assembly locating holes.
11. Fan(s)
12. Power Supplies
13. Receiving Card (Flash Module LED Controller Card)



Back view **Side View** **Bottom View**

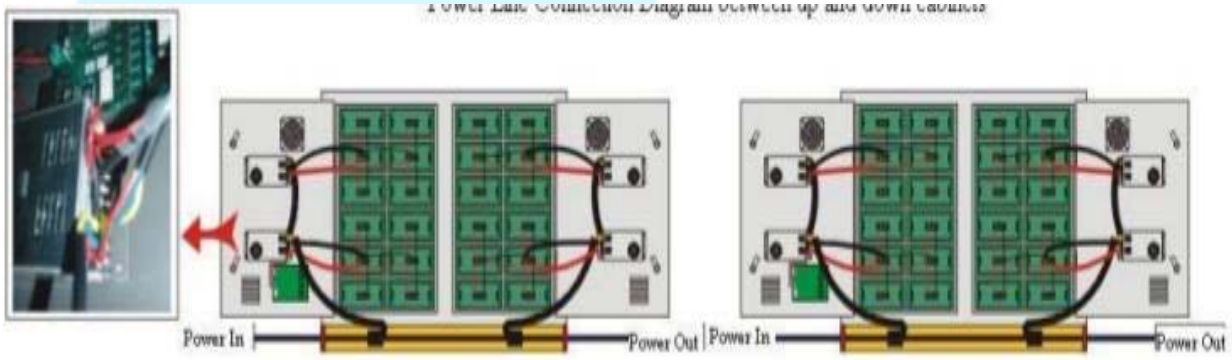


Cabinet Back (doors open) View

Cabinets have different locking mechanisms and may require special keys for opening.

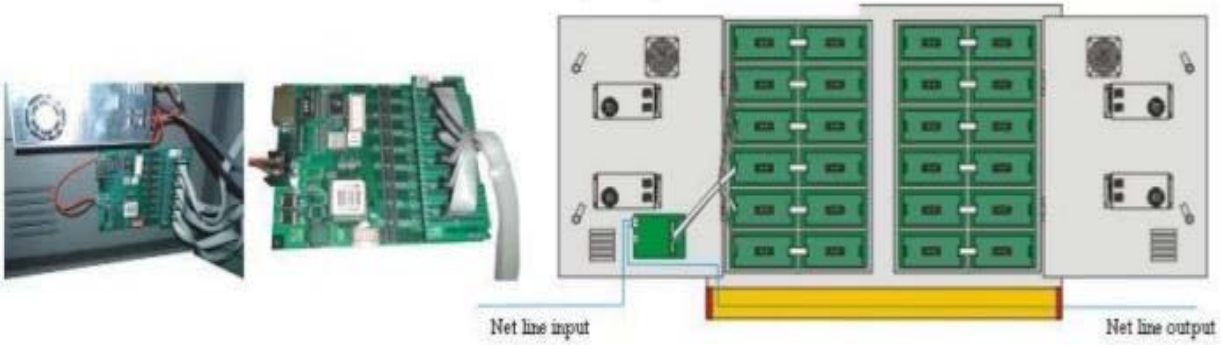
Cabinet's Internal Cabling

Following diagram illustrates a typical power cabling inside each One World LED cabinet.



LED Cabinet's Internal Power Cabling

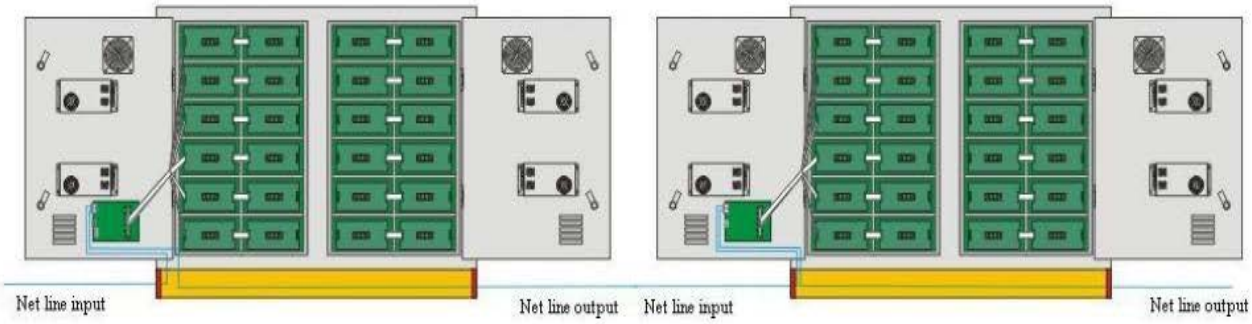
The diagram below illustrates the data cabling arrangement inside an LED cabinet.



LED Cabinet's Internal Data Cabling of Controller and LED Modules

Note that LED modules comprise of LED light bulb arrays mounted on a PCB that receiving card will map into flash memory locations contents (pixels) by LED mapping application. Below is a diagram of cascading the data cable for Flash Module Array System interconnections (between the controller or receiving cards).

Also note that the Curtain LEDs and the magnetic mounted LED systems do not use cabinets and utilize special mounting systems and housings.



Data Interconnection Cables between Cabinets

Please note that there is a very large number of LED modules incorporating various types and models of the components even for the same pitch and specification. Only modules with the same design, manufacture and components batch should be used as spares and replacement parts. Other similar modules will result in colour, brightness or scanning rate mismatch which may render the entire screen worthless.

For example indoor P6 SMD modules may incorporate SMD 1616, 2121, 3528 or 3535 from the same manufacturer, Specifying component type, say, Epistar or Silan is in sufficient to provide uniformity, Even the same Led component from two different packing batches may result in colour mismatch. Refer to One World LED Design Primer and the product specification sheets for more details.

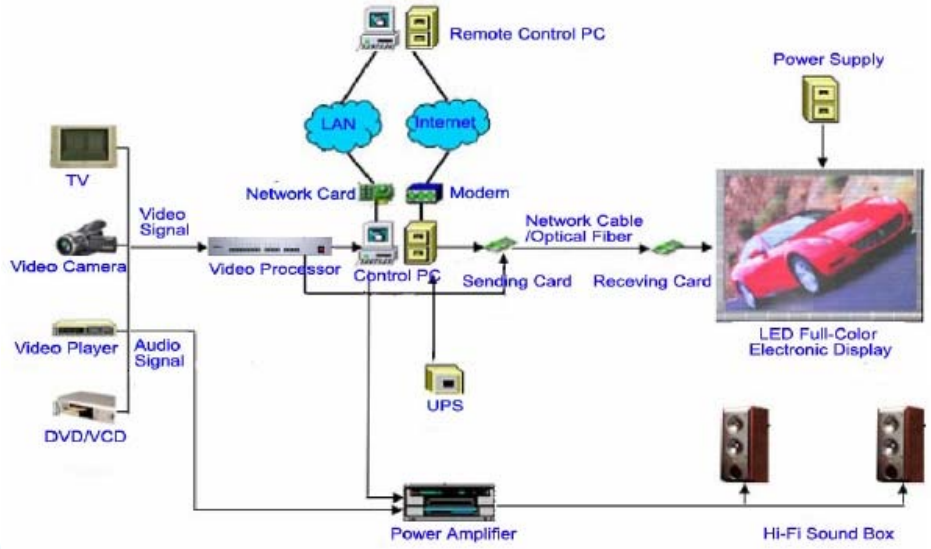
It is also important to note that there are tens if not hundreds of controller cards on the market for various types of LED screens and cabinets. The controllers for large full colour LED screen displays are divided into 3 categories:

1. One World FMAS controllers like Colorlight A8 and 5A
2. Daktronics control systems
3. Hybrids and Specialized like Linsn

Daktronics controllers intercept the hardware video signal from the computer and electronically map the correct number of pixels from that signal to the entire screen resolution. FMAS controllers send software data intended for the multi-media screens to the array controllers that each will map its intended parts of the data objects to its upstream devices such as LED modules. For more details refer to One World design and architecture primer documents. Hybrids intercept video graphic output signal and distribute it to receive only FMAS network.

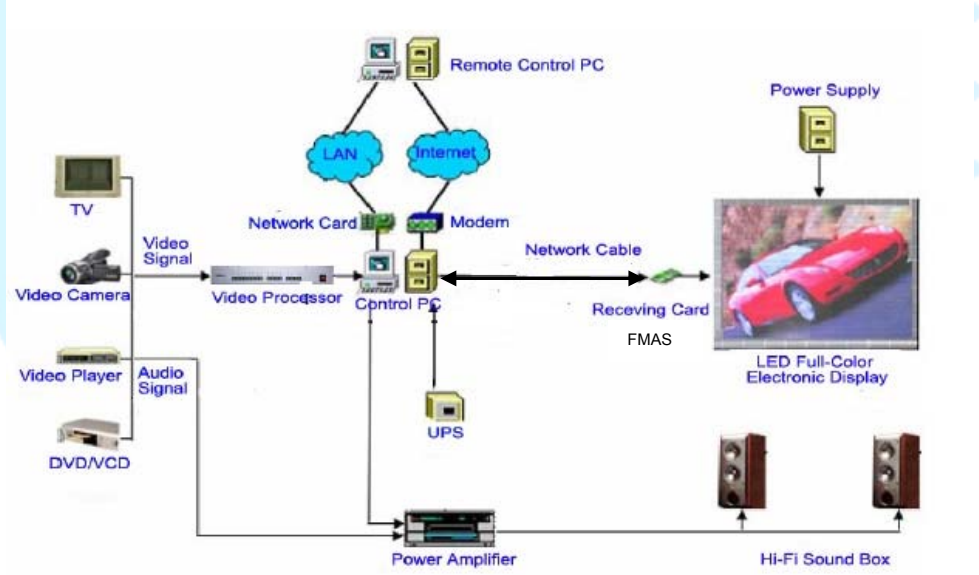
LED Control Systems Diagrams

Following diagram depicts Linsn control system structure.



Linsn's Daktronics Architecture Control System (Source:Linsn)

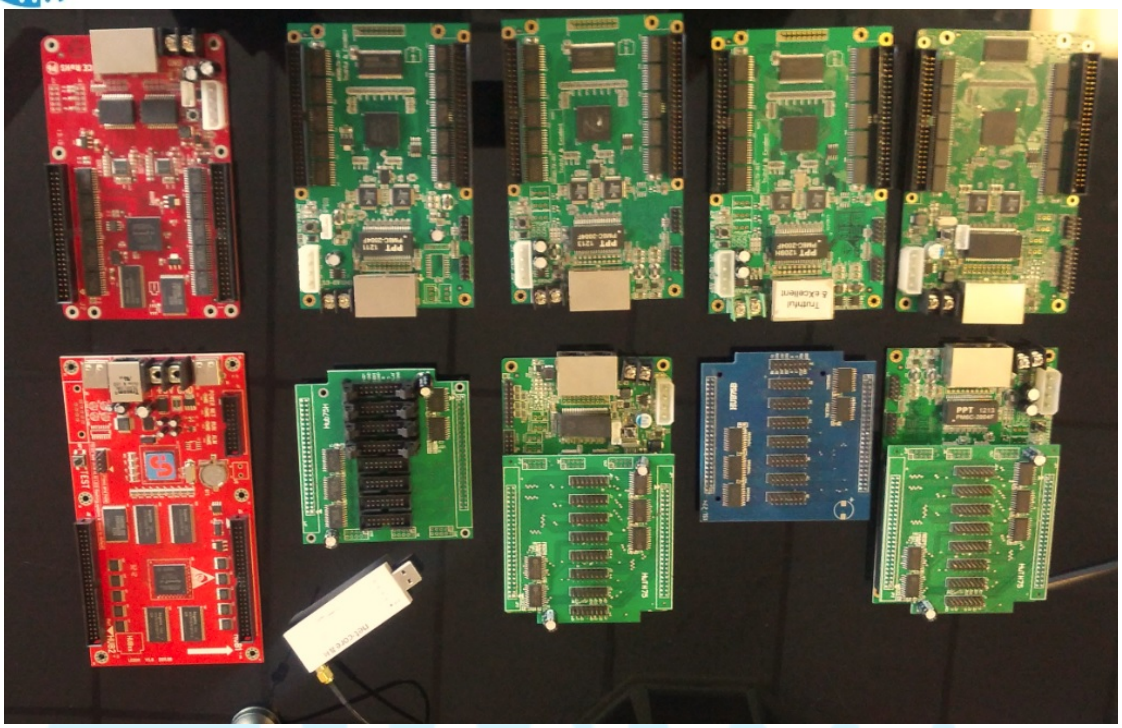
In contrast, following diagram shows the Colorlight control system incorporating One World's patented FMAS architecture and Colorlight's patented software sender.



Colorlight FMAS Control System Linsn/Daktronics Sender/Receiver

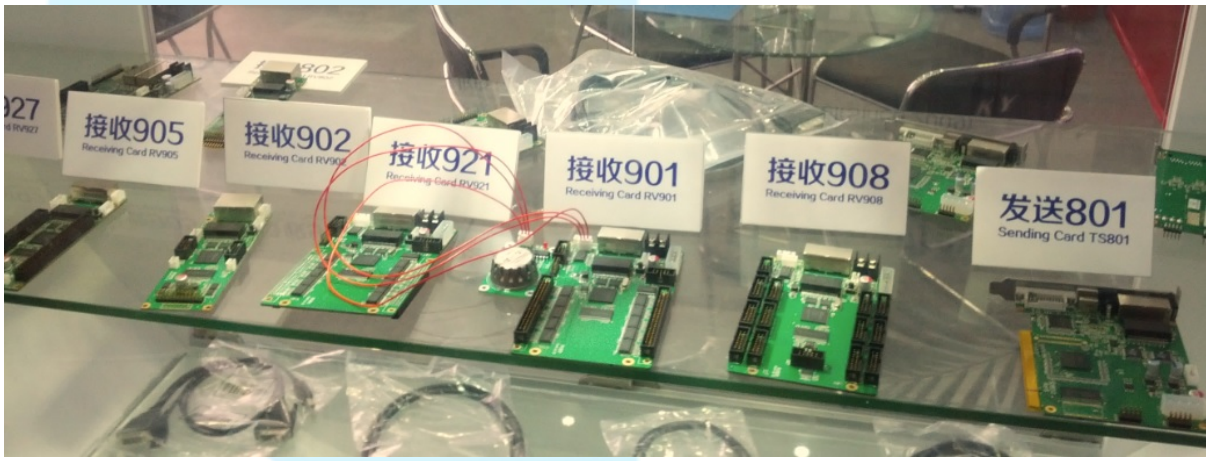
Note that the control system of this superior solution is two-way and no longer requires MS Windows "Control PC". Users may choose to control the display systems using open source platforms. This means using an Adverclient, one can control the screen and eliminate video signal processing problems associated with the sending cards of previous structure.

Following is a picture showing a number of different LED control cards.



Most Common LED Display Controller and HUB Cards

Hub Cards are simply a piggy back or daughter boards that allow various cabling configurations from modules to the controller (receiving) cards within the cabinets.



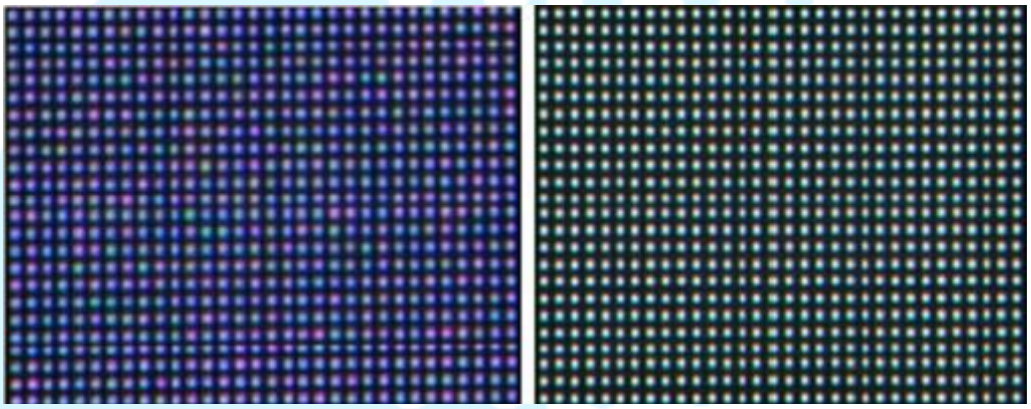
Linsn Control Cards on Display

Note that a large number of control card manufacturers simply source the Linsn control chips and circuit and manufacture their own version of the control system adapted to their own control application software and LED display modules. One world control systems incorporate the superior Colorlight control systems which allow two-way communication which is a requirement of virtual commerce rather than older hybrid technology of Linsn which implements a one way output to the display screen.

Pixel Colour Correction

Brightness and Colour uniformity is the most important factors that affect the image quality of a full colour LED display. Because of the limitations of the manufacturing process, including system structure design, LED lights selection, electronic components welting, system cooling, LED brightness decaying and many others, LED displays suffer the brightness and colour uniformity loss, which is a serious problem.

As an example, NovaStar pixel level calibration system is a side step from the manufacturing process of a LED displays that does not impact brightness or colour uniformity. Instead, it performs brightness and colour adjustment of the display after manufacturing and integration. By adjusting the brightness and colour of each LED light according to the software analytical results from the measured brightness and colour values of the LED lights. This pixel level calibration system can help eliminate certain LED display uniformity problems. See the example of before and after calibration below.



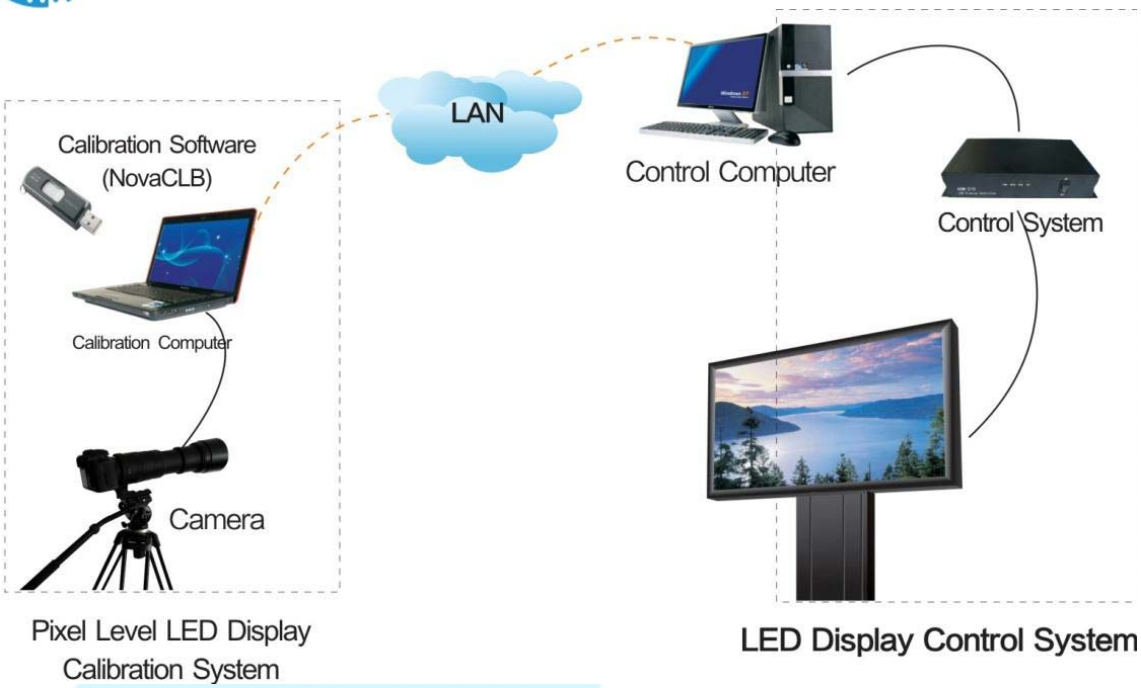
Display Affect Comparison Before and After Calibration

Calibration can be implemented in following settings:

- Factory single cabinet pixel level calibration (Factory calibration). Correct each cabinet on the production line to ensure good brightness and colour uniformity of the cabinets when produced.

- Field LED display pixel level calibration (Full-screen calibration). Perform calibration for a LED display at where it locates to improve its brightness and colour uniformity.

Factory calibration is more efficient and costs less than Full-screen field calibration. The light conditions must be the same for cabinet level calibration to achieve an optimum result. Cabinets in different lighting and LED lights consistency in the factory calibration will not result in a better outcome than that of filed calibration. When doing factory calibration, the matching NovaCLB-Cabinet 2012 is needed. See system diagram of calibration process below.



NOVASTAR Calibration System

The field recalibration can be easily avoided by host spares cabinet management to age the lights and modules concurrently with the screen in production. For more information of calibration systems refer to One World control systems partners Novastar and Colorlight websites. Colorlight website link can be found on the bottom of One World LED homepage.

For more information on proactive design of best led displays refer to One World Primer documents.

CAT-5/6 Wiring Diagrams

The following CAT5 wiring diagrams demonstrate how to correctly crimp RJ45 connectors on a CAT-5 cable for straight through network cables as well as crossover cables. The first set of instructions are for standard network patch cables (EIA/TIA-568B). EIA/TIA-568B, also known as standard Ethernet, is the type of CAT-5 connection used to connect LED screen receiver cards and cabinets' cable and other networking applications. (Source: Mike Haldas CCTV.)

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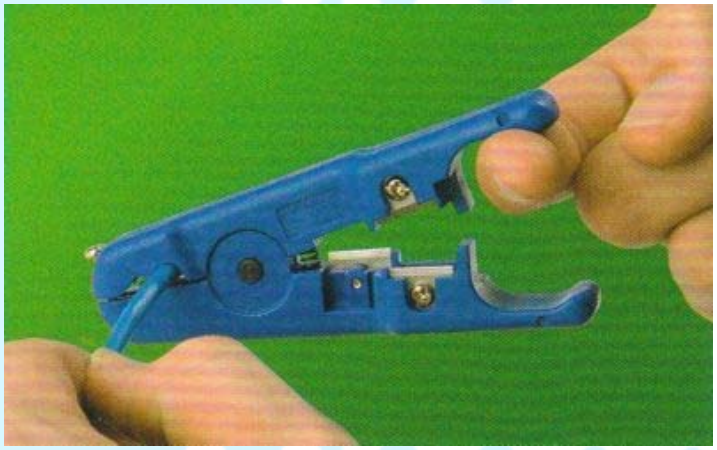
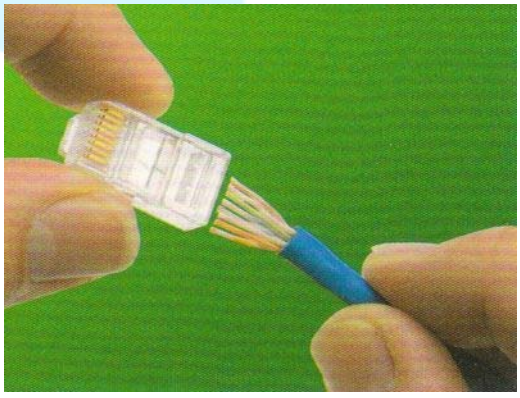
1. Using a cat5 cutter and crimping tool, strip about 1/3"of the out jacket of the cat-5 cable. Be sure not to strip or damage any of the pairs of inner cables.

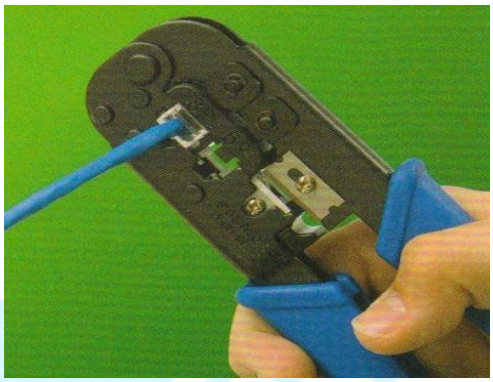


2. Assemble the pairs of wires in the following order for straight-through network cables (EAI standard / TIA-568B).

3. Insert the wires into the RJ45 jack as seen below. Be sure to keep the wires in the correct order.

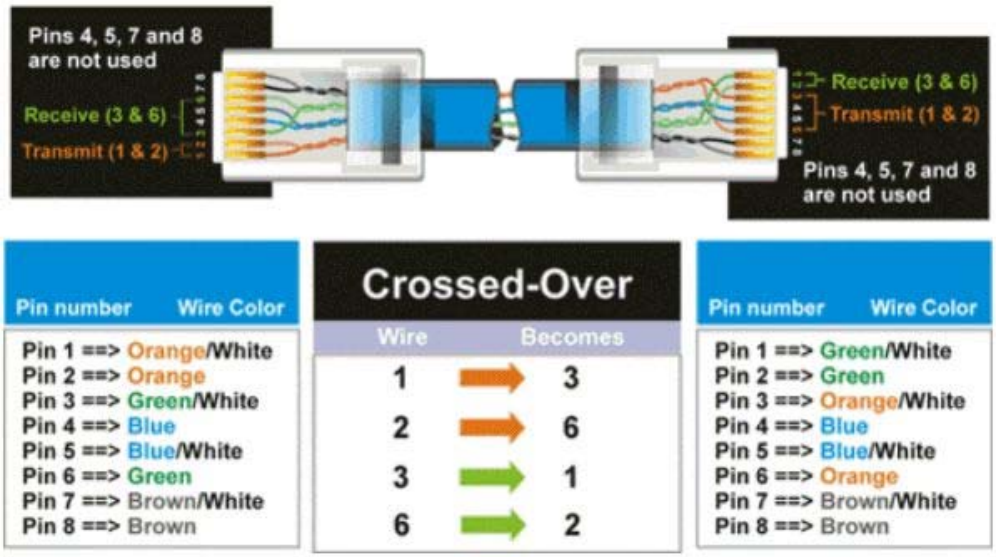


4. Insert the RJ45 connector into the crimping tool (again carefully make sure the wires stay inserted in the correct order). Crimp down firmly on the crimping tool to permanently attach the RJ45 to the CAT5 cable.



Crossover Cat-5/6 Diagram

For Crossover Cat-5 cable follow the same instructions as above except when you get to step #2, use the below crossover cable diagram:

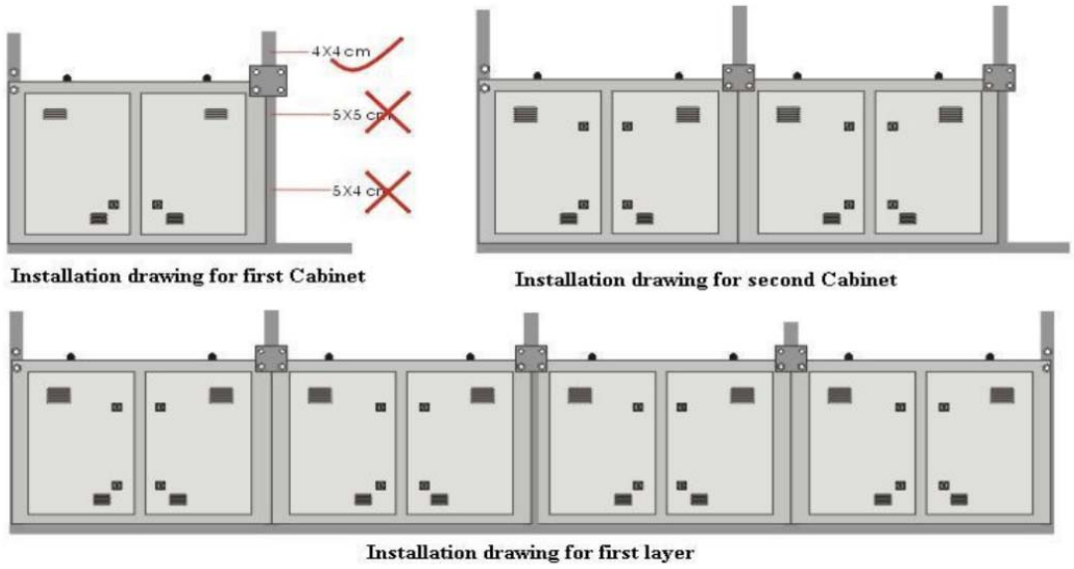


One World LED highly recommends use of the Cat-6E shielded cables for data cabling of LED display screens.

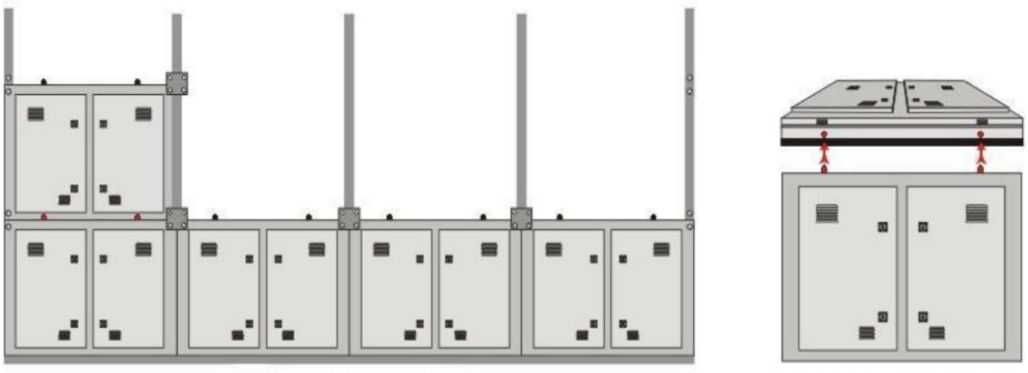
Exterior Framing and LED Display Construction

Before building a large display, make sure the design of the frame base and foundation is strong enough to prevent curving and for outdoor structures can stand the strongest possible wind force.

Then start by placing the entire bottom row on the base and in front of the U-channel that will hold the 4X4 CM framing studs. The perfect flat and level base will ensure smooth surface without increasing gaps as the display rows are installed.



Then place the second row from the bottom, aligning the mounting pins and holes before straightening the facing to a no gap finish.



Second Row Installation Diagram

Depending on the number of cabinets make sure to make provision for cascading power cords to terminate toward the power distribution source.

Cabinets' External Data and Power Wiring

After completing the installation of cabinets into the intended configuration, then connect the power lines as outlined below. Power can be turned on for off-line testing of individual cabinets (since there are no interconnecting data or net lines yet).

LED Cabinets Power Lines Connection Diagram

Please note that power lines are connected between a limited number of cabinets not to exceed the maximum available power at each socket of power distribution cabinet and not to exceed the Amps limit of the power cable itself (usually limited to 5 cabinets for 10 AMPs and 8 cabinets for 20 AMPs in P8 and P10 cabinets). This has to be performed by qualified electrician to avoid overdrawing power and damage to Led cabinets electronics.

Next the data cables are connected to build the LED Flash Module Array controller also referred to as net lines interconnecting the cabinets receiving cards. Diagram below depicts a large LED display data lines connections.

LED Cabinets Data Line Interconnections Diagram

Please note this inter-connection order will have to be followed in software configuration of the LED display for the set up software to correctly download the mapping of data (text, video and pictures) pixels into the LED lights array in the LED modules connected to each Flash Array Module.

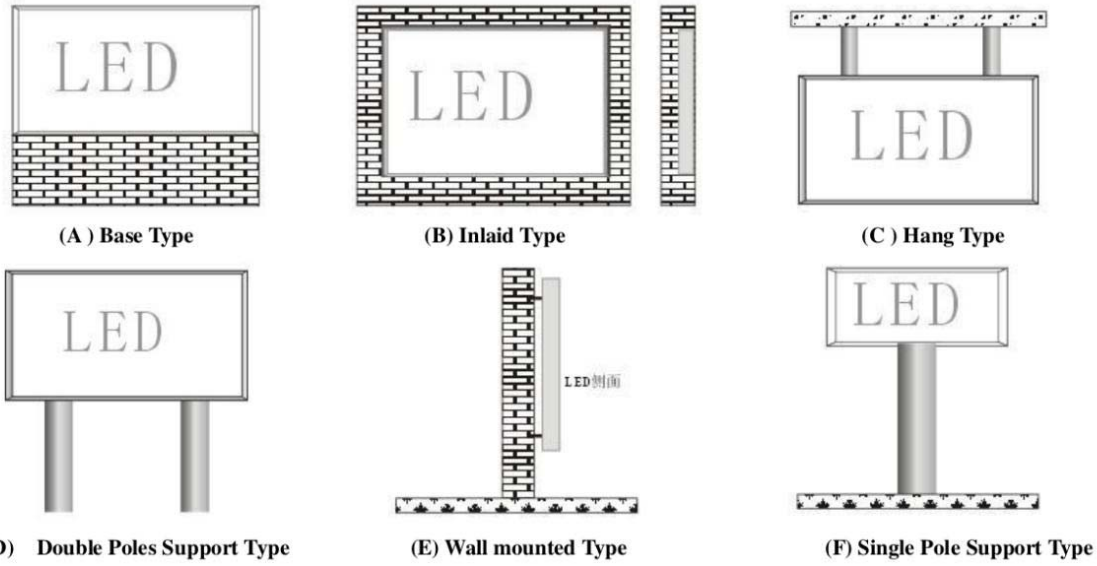
This section has focused on typical LED display construction using back-serviced cabinets. However, many wall-mounted and balcony rail-mounted displays in tight quarters cannot spare 60 to 100 CM service space required for back-serviced cabinets. This problem is solved by using front-serviceable LED cabinets.

The front-serviced cabinets require more diligent and intricate designs and will normally cost more to manufacture, test and ship. One World LED is a leading designer and manufacturer of front-serviceable indoor and outdoor units with custom cabinet sizes ranging from 50 CM height to 192CM and widths ranging from 40CM to 102 CM and supporting DIP and SMD in P6 to P20 range.

One World LED provides a range of popular magnetic-mounted SMD LED modules for indoor applications as another alternative to heavier front-serviced cabinets.

LED Display Installation Options

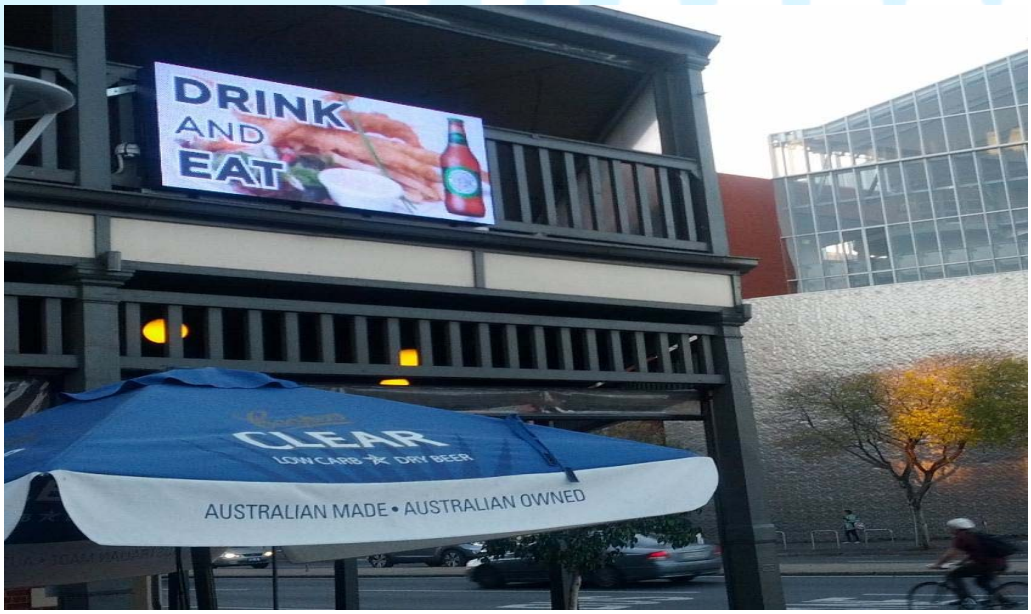
There numerous options for installing full colour One World LED screens and billboards. Following are six of the most common installation options.



(A) Base Type (B) Inlaid Type (C) Hang Type

(D) Double Poles Support Type (E) Wall mounted Type (F) Single Pole Support Type

Other less common installation options for One World LED displays include retrofit of single or double sided front-Serviced (FS) LED displays into existing light box signs and balcony (Single-sided Front Serviced) mounts. Picture below shows one such installation.



Balcony-mount One World LED Front Serviceable Digital Banner

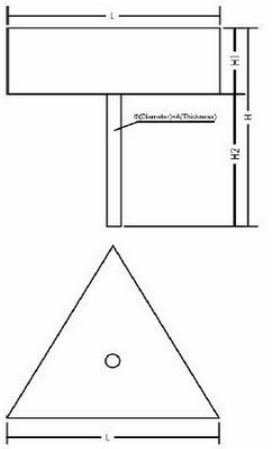
Billboards and Structures Check List

Traditional poster and vinyl billboards designs has been standardised around certain key measurements. These key measurements include,

Length of the Billboard display (L),
Maximum Height of the Billboard (H),
Height of the display (H1),
Height from the ground to the base of display (H2),

This translated into a billboard with display screen of L X H1 Square Meters. Also note that A) the pole height may exceed the distance between the base of screen to the ground and, the total height H equalling sum of H1 and H2 or (H=H1+H2).

The figures below show a typical manufacturer's Billboard data sheet.



⑤							
Parts / Sizes	L (M)	H1 (M)	H2 (M)	H (M)	Φ (M)	A (M)	Exw prices
ST6-2	6m	2m	4.5	6m	0.6m		
ST12-4	12m	4m	8m	12m	0.8m		
ST15-5	15m	5m	10m	15m	1.0m		
ST16-6	16m	6m	10m	16m	1.05m		
ST18-6	18m	6m	12m	18m	1.05m		
ST20-6	20m	6m	12m	18m	1.05m		
ST20-7	20m	7m	11m	18m	1.05m		
ST21-7	21m	7m	13m	20m	1.05m		
ST25-8	25m	8m	15m	23m	1.05m		
ST45-15	45m	15m	10m	25m	1.5m		

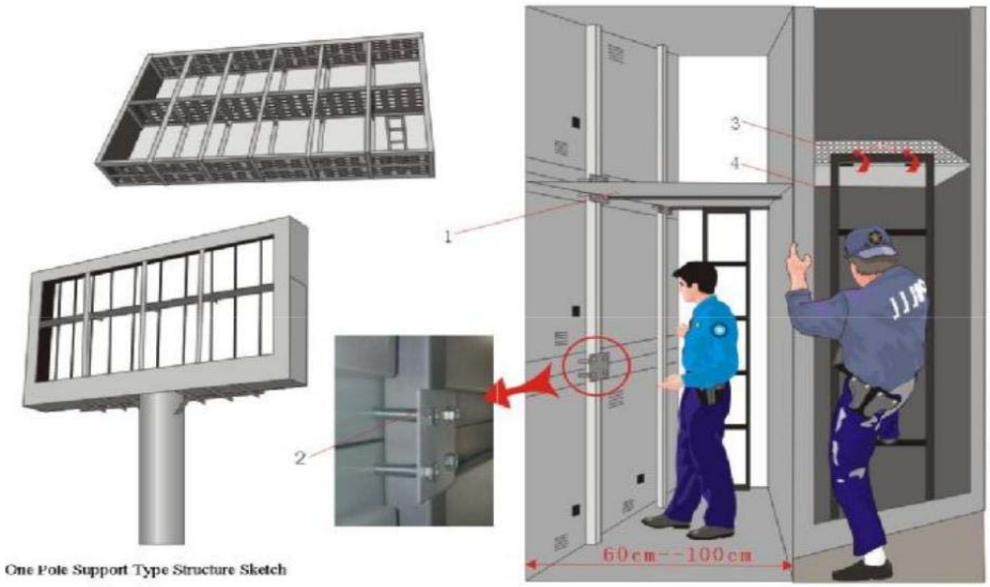
Size	L(M)	H1(M)	H2(M)	H(M)	Φ(M)
6×2	6	2	4.5	6	0.6
12×4	12	4	8	12	0.8
15 ×5	15	5	10	15	1.0
16×6	16	6	10	16	1.05
18×6	18	6	12	18	1.05
20×6	20	6	12	18	1.05
20×7	20	7	11	18	1.05
21×7	21	7	13	20	1.05
25×8	25	8	15	23	1.05
45×15	45	15	10	25	1.5

Typical Traditional Canvas/Vinyl Billboard Data Sheet

These same data sheets are also used for LED billboard designs specifications. However, the critical difference is in, A) design for support of additional LED cabinets weight and, B) Electrical cabling and distribution to power LED cabinets rather than the flood lights around the base of the screens.

Following diagram shows the design and internal space of a typical single pole LED billboard frames for a double sided back-serviceable cabinets.

Typical One World Single Pole LED Billboards



Typical One World LED Billboard Structure Design

Custom Billboard Interior Picture (No-backing Cabinets)

More information about Billboard systems in included in the design considerations sections of this handbook.

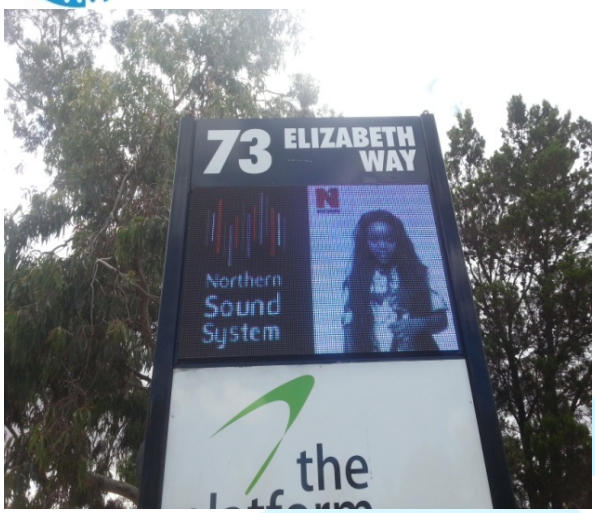
LED Retrofit of Light Boxes and Static Signs

One of the largest market segments for LED digital signs is that of retrofit or upgrade of the existing light box and static signs. Below you can find the front and the back pictures of one such static sign.

Picture of the Front of Static Sign

Picture of the Back of Static Sign

These signs can easily be upgraded without going through a lengthy development plan approval. However, it is important to work with an experienced LED manufacturer such as One World LED and one of their qualified LED sign designer and installers to avoid problems and have a smooth installation and to enjoy maximum benefits of digital features and capabilities of the LED technology.



Picture of The Front of LED Retrofit

Picture of the Back of the LED Retrofit

The above pictures show the same static sign after a retrofit to LED digital screen with an Adverpost server for remote advertising and contents management. The advantages of the One World LED full colour digital screen is not only it allows variable messaging with little effort it also extends the visibility and application of the sign from day time only to a round the clock.

Retrofit Installation

The above example incorporated six One World LED 480X480mm, P10, Outdoor, Metal-Cabinets to replace an existing 1000X1500mm standard outdoor static sign. A double-frame of 25X60mm Galvanised steel was used for transition and locking of the LED cabinets and cables in the existing frames and the posts.

One World LED Standard LED Signs

One World LED is the leading supplier of LED signs such as schools, churches, real estate agencies and other commercial applications to resellers. Following sections describe some of the most popular LED signs and applications.

One World LED Church Signs

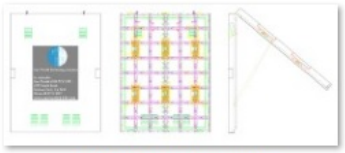
Church LED signs have contributed significantly to automating the delivery of the periodic message to the public and church goers as well as publicising sponsors and advocates for community recognition.

The church signs are usually made in single or double sided, embedded or stand-alone formats. Following is Gallery pictures show these common LED Church sign packages.

One World LED Double-Side LED Church Sign

Following are examples of Church LED sign Galleries by One World LED resellers.

00 Design Cabinets.jpg

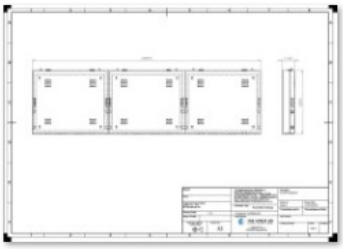


03 LED Cabient Design .jpg

04 Manufacturing Cabinets.jpg

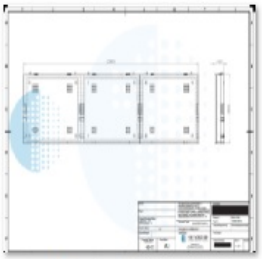
05 installation.jpg

06 Operation Picture.jpg

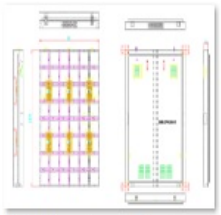


Cabinet Drawings .jpg

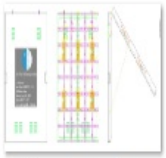
Double-Sided Embedded Church LED Sign Example 1



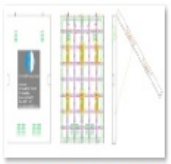
00 Design Cabinets.jpg



02 Cabinets Layout Design .jpg



02a Cabinet Backs Design.jpg



03 LED Cabient Design.jpg

04 Installation Verification by OWL.jpg

05 Installed LED Sign.jpg

One World LED Double Sided, Embedded Church Sign Example 2

One World LED Display Signs and Screens

Single-sided Embedded School LED Sign

Large Screen TV Format LED Display for Hotels and Pubs Example

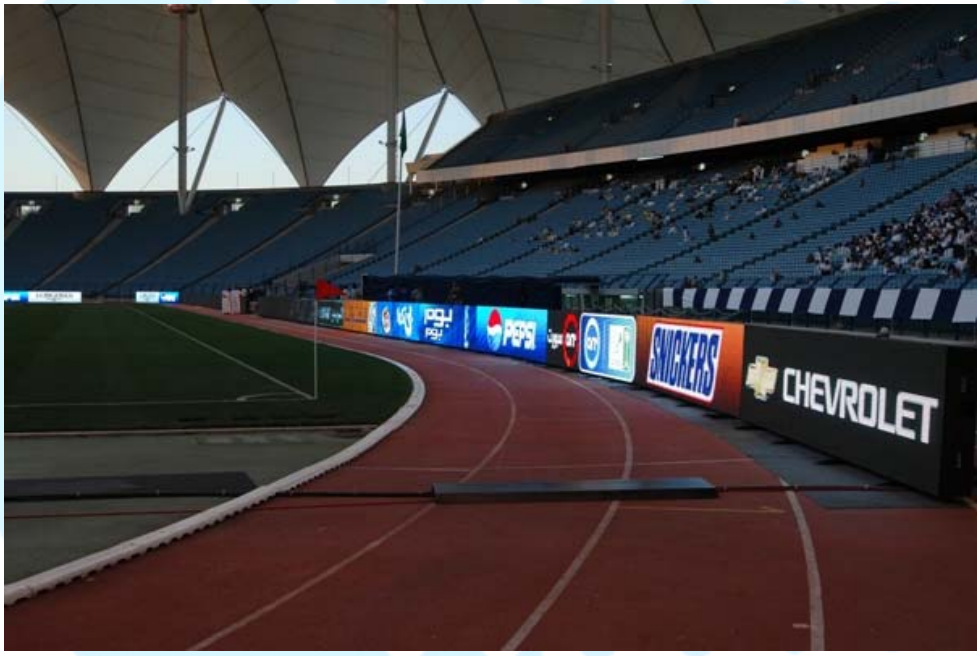
One World Sports Applications of LED Displays

After commercial advertising billboards, sports complex applications such as scoreboards, replays and perimeter advertising represent the largest segment of the LED market.

Traditionally governments have selected international corporations for installation of stadium scoreboards. This has led to a few companies dominating this market. However, most of these corporations deploy and install proprietary and non-standard systems that are obsolete and hard to maintain and upgrade.

Today, most local resellers are backed by manufacturers like One World LED are able to install and support the state of the art Sport LED solutions at a fraction of those international players. These solutions as described in this section provide a superior technology, quality and interoperability than the proprietary solutions of older providers. These advances are made possible by innovations such as patented Flash Module Array Systems of One World.

This section covers the key aspects of the Sports LED Display market.



Product Description:

The One World LED Sports Perimeter Display can be used for advertising on the perimeter/boundary of a football, cricket, baseball, rugby and other sports' fields.

For outdoor or indoor applications including basketball, ice hockey, tennis perimeter displays, One World LED has the technology and experience to provide the best LED display systems. Below is an example of the functional specifications with reference to a 12mm outdoor led perimeter display. For more information on other pixel pitch, drop us an e-mail and we will be glad to supply the information you need.

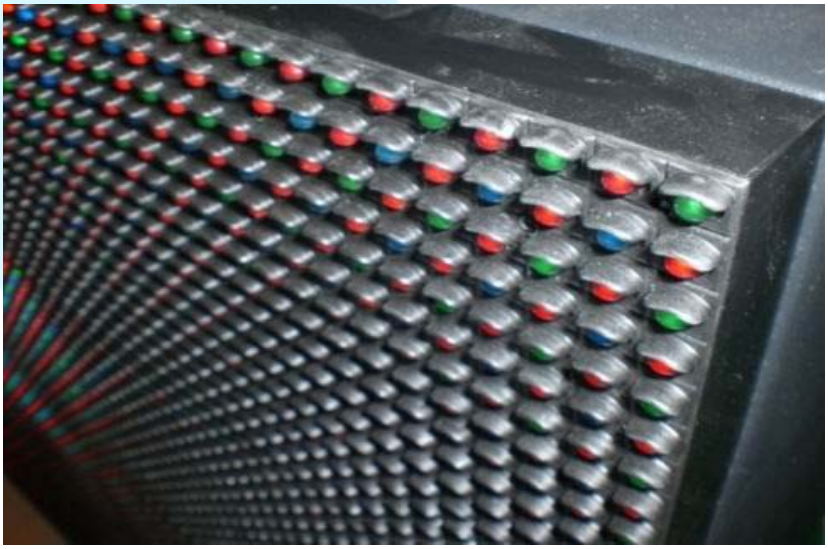
Functional Specification

One World LED offers a large array of high quality full colour, indoor/outdoor, synch/asynch LED displays systems with resolutions ranging from P4 to P20. These system offer features including:

- Multiple file formats including AVI, MOV, MPG, DAT, VOB are comprehensive, and also we have three display mode as VGA+VIDE and VGA. There are also interfaces for Sound signal and video signal.
- 10 BIT grade grey control system and the color is over 16.7 millions, and the brightness, contrast, saturation, chromic can be adjusted by manual and sensor, whose scope is 256 grade.
- Supports multiple concurrent windows for word, text, graph, picture, video, 2-dimensional, 3-dimensional cartoon and other information and supporting multiple OS platforms synchronously and/or asynchronously. The larger pitch displays with multiple red LEDs incorporate virtual Pixel technology for improved sharpness of image display.
- Can be connected with PC (Windows or Linux) and the web with content management systems locally or remotely.
- Can be used outdoor in any weather condition with excellent antisepsis and waterproofing.

Special Design for Sports Facilities

Soft front screen, to prevent sportsman injuries and to protect the screen from balls and other objects. Module photos as below:



2R1G1B soft frame of led module

Adjustability: can be used for fixed perimeter display or the sliding degree adjustable. Display cabinet supports multiple angle adjustments. Following is a gallery of sports LED pictures.

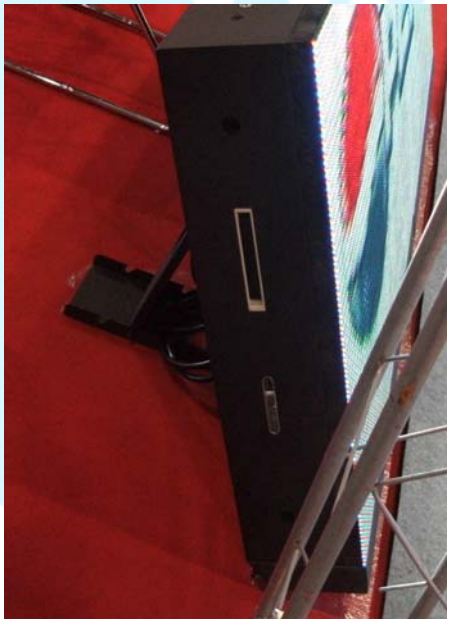
Advertising Platform: attractive high resolution technology incorporating Flash Module Array Systems with multiple software technology platforms support (Windows and Linux) for scalable advertising with real-time web support.

The pictures here show the backdoor and slide/lock mechanism for field installation and service in a fixed or removable arrangement of perimeter display system.

Picture above demonstrates interlocking perimeter display cabinets to form a seamless configuration.

The cabinet accessories are removable. Same systems can be used in multiple settings as perimeter display or back serviceable large screen systems with higher resolution (for example, P4, P8, P10, etc.) for replay and or scoreboards.

The cabinet's side locks allow seamless arrangements for interconnecting cabinet to form a perimeter display. Below is the side view of a display cabinet.



For Design Specification for Sports LED products contact One World LED or visit One World LED website.

Chapter 2 – Design considerations

One World LED Design Considerations

This section covers design considerations for various LED display parts.

LED Components Considerations

For full colour LED displays the brightness is controlled by factors such as the LED component type, quality, size and quantity per pixel site. Quality is determined by manufacturing process and technology.

The component type may be SMD or DIP. DIP is usually much larger and provides for higher design flexibility for outdoor applications where higher pitch and additional brightness is required, especially in applications where the screen may be directly facing the sun for parts of the day (referred to east or west facing installations). SMD is more common for indoor and smaller short-distance outdoor applications.

Quantity of pixels refers to the population of LED components per pixel. For example a P16 LED module design may incorporate 1R1G1B (one red, one green and one blue) or 2R1G1B (2 Red, 1 Green, 1 Blue) or 2R2G1B (2 Red, 2 Green, 1 Blue) depending on the increasing level luminescence and brightness needed by the application. Utilising the wrong design in pitch, quality or quantity will compromise the picture quality and visibility of the full colour images and videos.

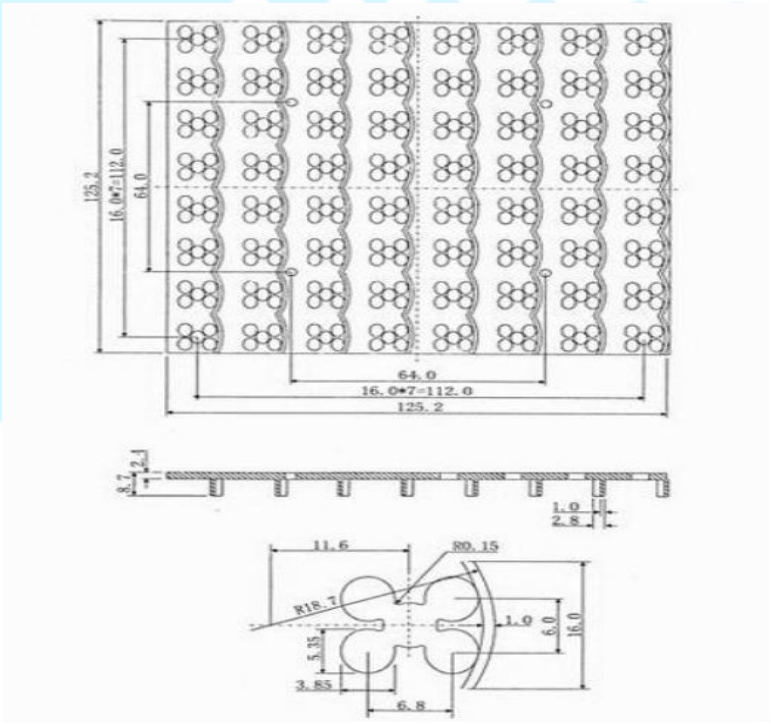


Diagram of 8X8 LED PCB Cover P16 Design Incorporating 2R2G1B

LED Component brands for LED screen

The LED lamps are a key component of the LED display systems. This component determines the most important and visible features of the screens. These components are supplied in two different forms of SMD (all three in one) and DIP (separate red, green and blue lamps) and various sizes to meet the design needs of various pitch and module sizes. For this discussion, we are using the overall experience and criteria for LED display screens.
Because the LED lamps determine the visible qualities of the screen and are comprise the largest number of components used in building and maintaining the LED screens, their reliability numbers are often used to establish or quote the system's reliability.

The LED lamp quality and functionality are determined by the component's brand and manufacture. These lights are expected to last 5 to 10 years and their energy utilization, maintenance of brightness and colour clarity will determine the usability, service life and cost of ownership.

The largest of the over 100 LED component manufacturers include:

- Silan (China)
- Epistar (Taiwan)
- Nichia (Japan)
- Cree (USA)
- AXT (USA)
- Taiwan-Opto (Taiwan)

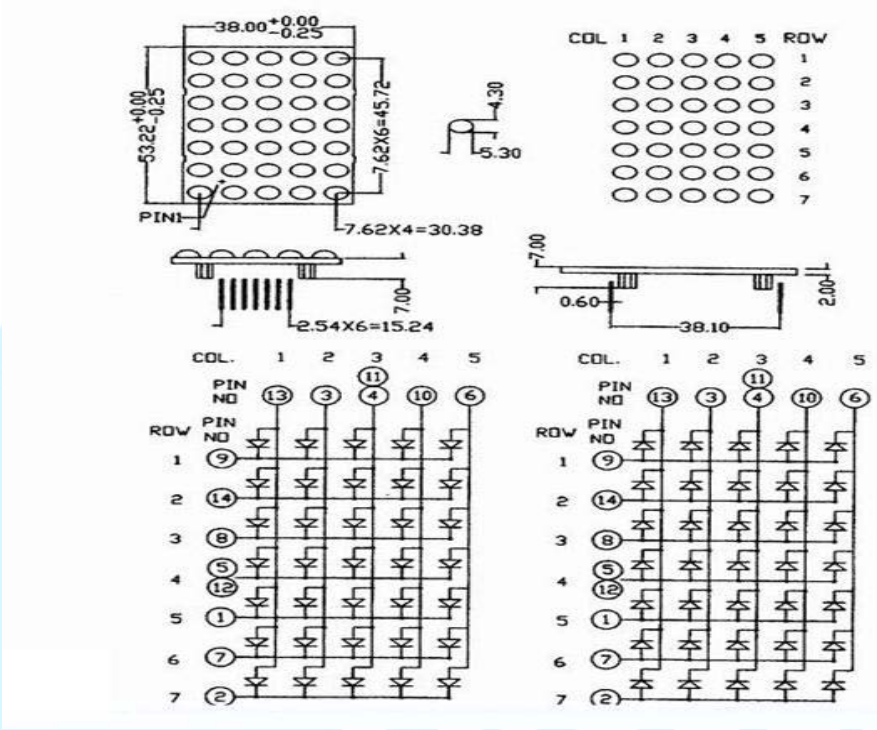
The market ranking opinions vary depending on the application of LED components and the lamp colours. For example for street lighting and commercial space lighting use, Cree may be ranked number 1 and for quality of overall components, Nichia may be ranked highest. Primarily for these reasons not relevant to full colour LED displays, Nichia and Cree are the most expensive Led components. However, for full LED screen displays and as explained above, Silan is the most preferred LED component of One World LED.

Because most of these components are new and have not been around for 5 years or more, the life-expectancy is usually determined by deploying a very large number of components for a short period of time. For example, if 10,000 LED lamps of a certain manufacturer remain operational at full brightness for a 10 hour period then that constitutes 100,000 hours of operation without failure or degradation. In reality, no one has left a Cree or Nichia LED lamp on for a period of ten years to see if it remains acceptably operational in the desired environments. However, extensive use of Silan by One World has helped us conclude it is a superior product for our designs and user environments in LED screens.

Other key factors for comparing LED components include: Reliability, Brightness, Sensitivity, Cost of ownership, ROI. For technical details of LED design please refer to One World LED Design Primer document.

LED Module Circuit Design Considerations

One World LED is proud to detail the design of various LED system components in this section for the benefit of all LED users, designers and system integrators. Design of LED circuits, modules, frames and components. This section briefly outlines diagrams of single, dual and full colour LED circuits, PCB and mounting frames.

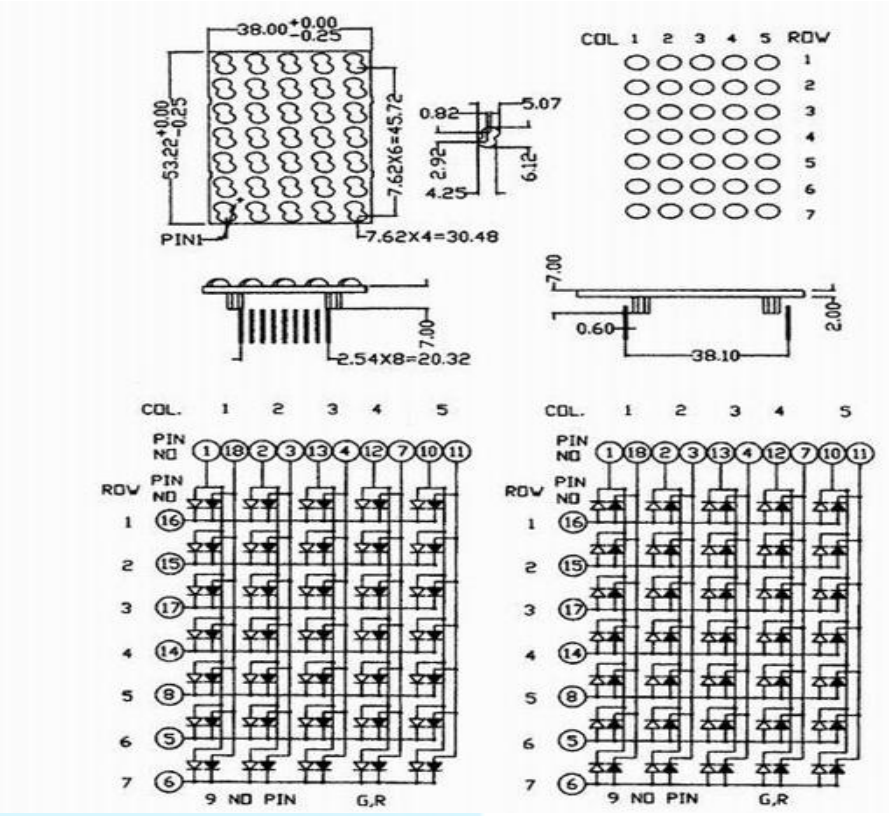


Above Diagrams Detail Circuit Design of a Single Colour LED Circuit

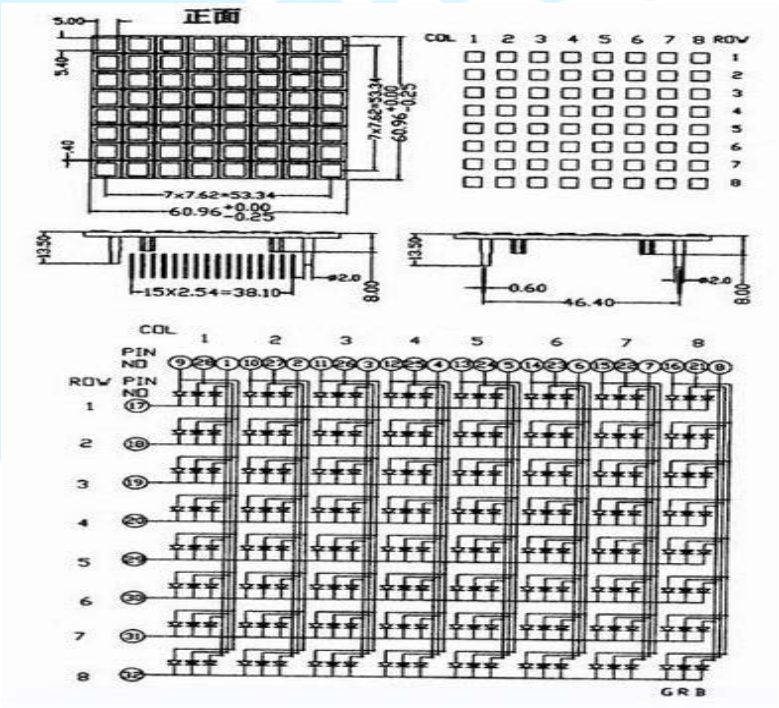
The above shows the single colour LED circuit design that is commonly used to construct very low cost scrolling text message boards and signs. This LED circuit would normally require a very simple Flash Module Array or Asynchronous receiving card (depending on the size) to map the bit matrix of different characters into LED arrangement and provide different effects such as scrolling, raining and flashing.

Changing this design to a two colour LED is fairly simple and the diagram below shows the design considerations for such circuits. Again, the same control systems with little or no modifications can control such dual colour LED modules. The additional effect control of colour designation is needed to map the text or display to the LED array of the colour selected.

The positioning and population of the LED components on PCB real estate will determine the pitch and view quality. The higher the density the higher the quality and usefulness versus the viewing distance. See below for more details.



Above Diagrams Detail Design of a Dual Colour LED Circuit

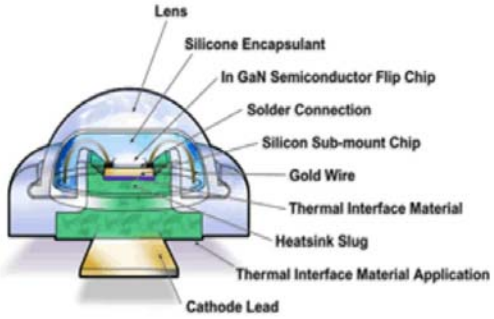


Design Considerations of a full Colour 1R1G1B LED SMD Circuit

Note - One of the important design considerations in transferring the design of an LED circuit to a PCB is that of maximising the effect of the displayed image and reducing or efficiently allocating the dead-space (unused real-estate) to prevent black line or background visibility for non-curtain LED modules. This is best shown by the design of the LED PCB covers shown in the diagrams with the circuit designs.

What is LED?

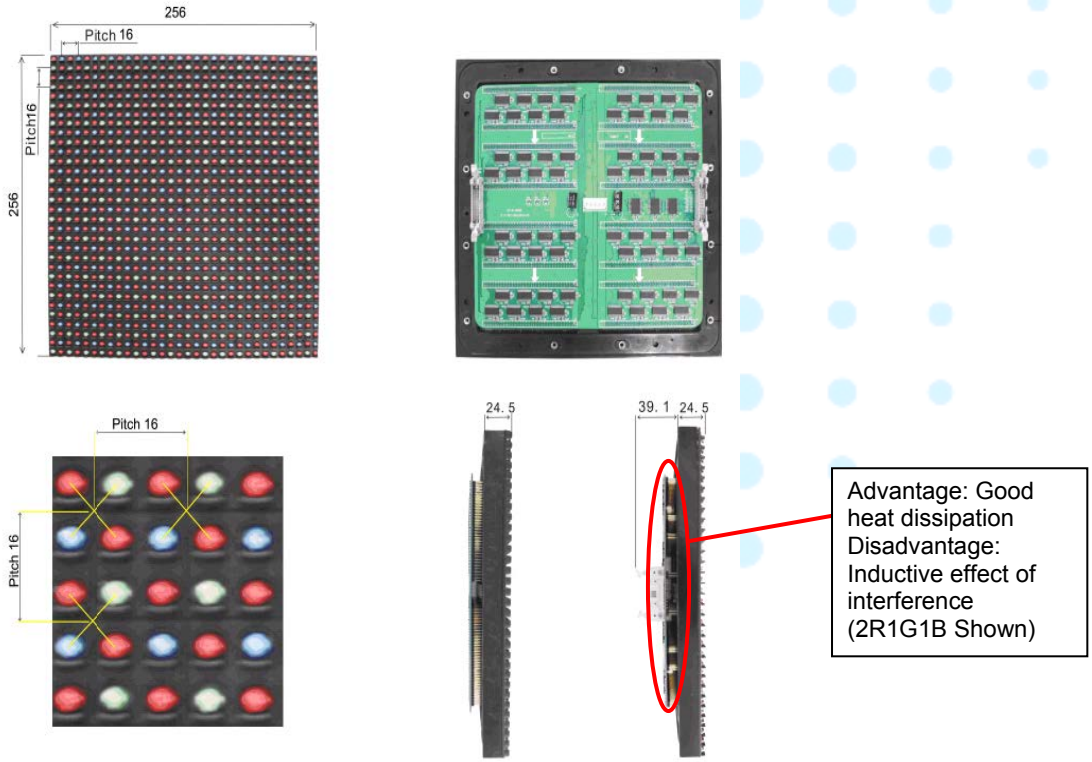
Since their inception in the early '60's, light emitting diodes (LEDs) have gained widespread use and now can be found nearly everywhere.
The devices are created by depositing two thin layers of materials onto a substrate, one with an excess of electrons and the other having "holes" and needing electrons to achieve a more stable
state.



When a potential is applied across the device, the electrons and holes move in the opposite directions. This causes light to be emitted with a wavelength and color determined by the energy released when the electrons and holes combine.

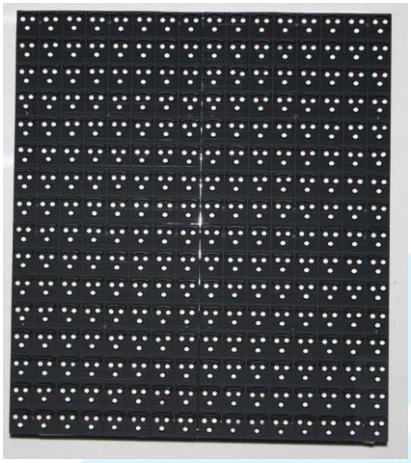
Importance of Module Design Considerations

One key PCB Design consideration is whether to use Lights and Driver ICs together or separate. Following shows design keeping lights and driver ICs separate.



And the following figures show the design incorporating lights and driver ICs together. While the dual card modules makes the factory repairs simpler it creates an additional subassembly which increases the unreliability of the overall design.

Note that a good design minimizes the overall screen heat dissipation and energy consumption which actually embodies the best module design.



Advantage: No inductive effect of interference
Disadvantage: Not easy to repair
(1R1G1B shown)

This one example of module design consideration proves that users can risk reliability, uptime and service costs versus operational integrity of the LED screen.

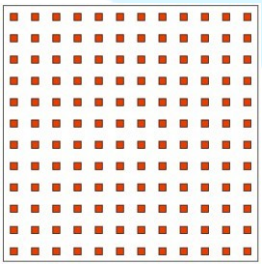
Especially, those users who select solely based on price or by selecting an LED product without full consideration of product design features for given applications.

LED Display's Scan Rate (or Mode) and Refresh Rate

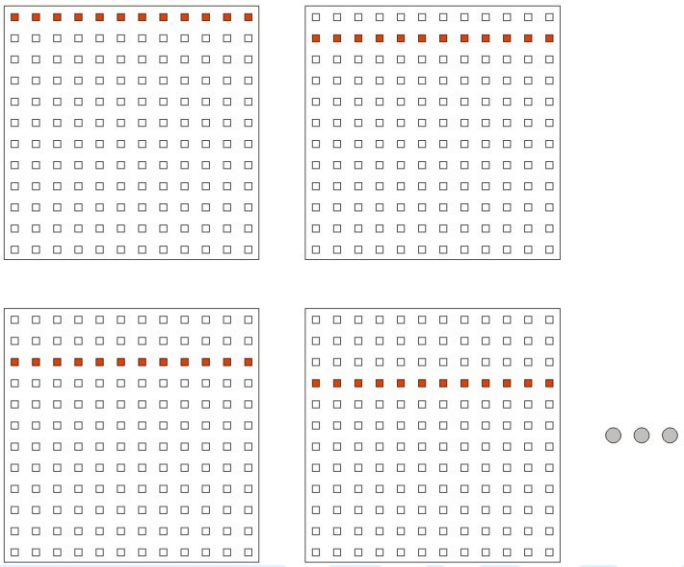
The scanning rate of LED display should not be confused with the refresh rate of the display which refers to number of images per second that can be displayed on the screen. Following section details the Scan Rate explanation.

■ Means LED is driven by IC and, □ means LED is off for this explanation.

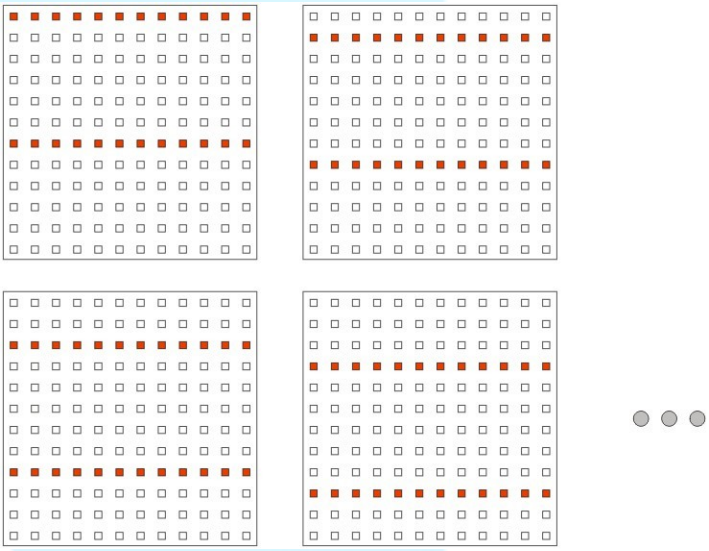
Each driver IC chip has 16 pins, and can drive up to 16 LED components at the same time. Static drive mode means all the LEDs on the LED module are driven by IC at a given time, as shown in the following image:



1/12 scan mode, means 1/12th of LEDs on the module of this example are driven by the IC chips at a time, and next cycle the next 1/12th of LEDs are driven as shown in cycles below. In this example the LED lights are off 11/12th of the time or most of the time which will make the screen to appear much less bright (or dark).



1/6 scan mode, means 1/6th of LEDs on the module are driven by the IC at a given time, and next 1/6th LED are driven next. Below pictures four cycles of driving the screen at 1/6th scan rate.



The above example of 1/6th scan rate is twice as bright as the 1/12th scan rate but will require twice the number of IC driver chips and consume twice as much power. Another way of looking at this is that the 1/12th scan rate the lights are off twice as much as 1/6th scan rate. For more details please refer to One World LED Design Primer document.

Note: Because the scan rate change scan lines faster than can be noticed visually, one feels like the LEDs light are on all the time. In fact, the scan rate has LEDs off at the complemented rate. Thus, the effective brightness is a function of LEDs Scan Rate.

Consequently, the lower scan rate can save LED driver IC counts, energy and costs and increase life expectancy and reliability. The tradeoff is the brightness and visibility. Following details some of the effects on the LED screen:

1) Brightness: The high scan rate means more LEDs light are on at one time, so the brightness are higher as compared to lower scan rate. In theory, for the same LED display, static scan is double brightness of 1/2 scan, and 1/4 scan is double brightness of 1/8 scan. But this is not an absolute formula, because the design may not require the higher brightness, and or demand lower current draw. So, the brightness is a design factor that impacts the LED purchase, reliability and operation costs.

2) Refresh rate: Usually lower scan rates (1/16 or 1/8) associates with lower refresh rate and the higher scan rates with higher refresh rates. And this is not necessarily a direct relationship as multiples formula of brightness, because the refresh rate mostly depends on the PCB design and control system. For details of refresh rate versus frame refresh rate and their impact on LED image quality, please refer to One World LED Design Primer document.

3) Power consumption: In theory, the higher scan, the higher power consumption. This relates to the multiples formula, for example 1/5 scan rate doubles the power consumption over the 1/10 scan rate. Also, it restrict by the current, factories may reduce current and finally reduce power and brightness. Therefore, it's very important to choose correct scan rate for LED displays optimum operation. It is not necessarily the higher the better or the converse of it. For the optimum design of LED screen, one must take into consideration the Size, Pitch, Scan Rate (brightness, power consumption), refresh rate and purchase budget.

LED Module Power Calculations

The maximum power requirements for LED modules are calculated as follows.

1-For the LED display components the max current requirements are: R=20mA, G=15mA, B=7mA, in total, it is safe to use 50mA for calculation. And voltage is 5V.

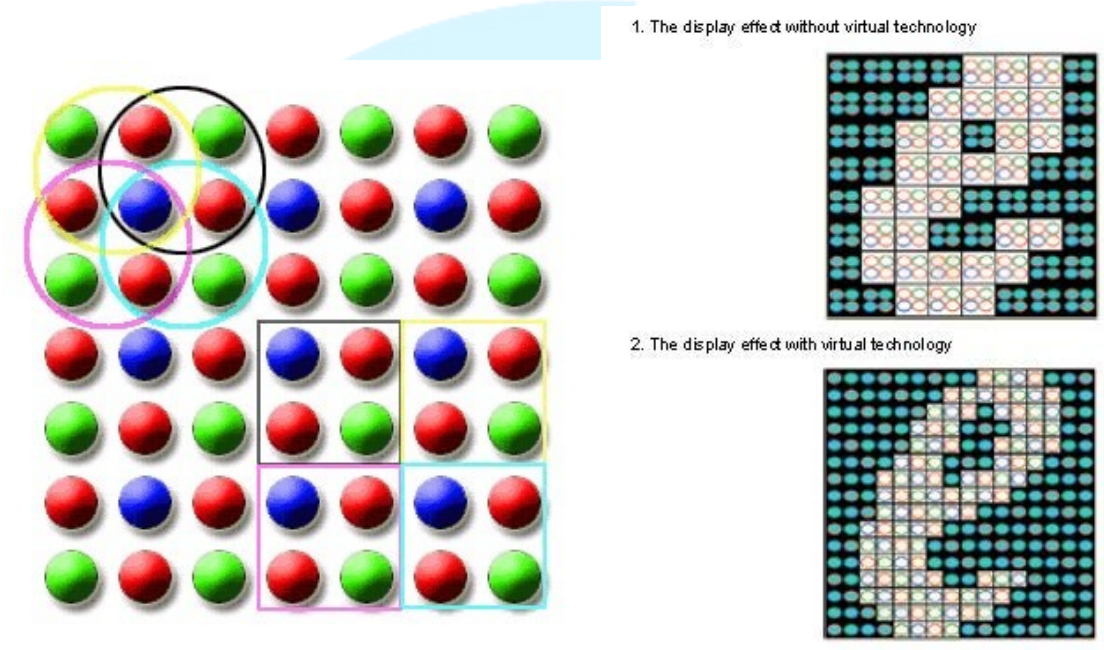
2-Then take modules resolution, say, for a P6 module with 32×16 pixels of 1R1G1B as above, 1/8 Scan Rate as an example, the Maximum power in Watts is calculated as:

W= V*I => 32x16x5Vx0.05Ax1/8=16W.

For more explanations you may refer to the following link: http://www.lednews.org/whats-the-scan-mode-for-led-display/ for original source of this material. Many product specification sheets list the maximum and average power requirements on a per square meter basis.

Virtual Pixel Technology

For the large pixel (P16 or higher) with multiple red and or green LED lights the normal display of separate pixels may appear too grainy and jagged. The Virtual Pixel technology can be used to enhance the sharpness of image or video. This is accomplished by sharing each LED by the four contiguous pixels around it at the same time. See drawing below. Unlike the real pixel which uses each pixel's LED lights to display only one color dot, the Virtual Pixel shared lights between adjoining pixels to display multiple dots at the same time thus smoothing the edges.



Diagrams of Virtual Pixel vs. Real Pixel Display (Source: http://www.led-displays-china.com)

With the virtual pixel technology, it is possible to use the same number of pixels to display a sharper image or video than on a similar size and pitch real pixel led display. Theoretically, the Virtual Pixel technology may requires as low as ¼ of the real pixel display for similar drawing image sharpness. In other words, on the same size LED display, the sharpness with the virtual pixel technology could be up to 4 times better than the one real pixel technology display of the same pitch. But in reality, the sharpness of virtual pixel LED display is at best 70 percent better than a similar pitch real pixel display depending on the contents of the image.

The Virtual Pixel LED display Versus the Real Pixel Display

1. Physical Arrangement:

Generally in a real pixel LED display, each pixel consists of 1 red, 1 green and 1 blue LED (1R1G1B). Although all the pixels are placed in average distance, not all the LEDs are placed in average distance. Each pixel can easily be identified from other pixels in a close inspection.

In virtual pixel LED display, each pixel consists of 2 reds, 1 green, and 1 blue LED (2R1G1B). All the LEDs are placed in average distance. Each LED is shared by the contiguous 4 pixels.

So there's an easy way to distinguish virtual pixel LED display by the physical appearance is to see if the pixel consists of 4 LEDs (2R1G1B), and if all the LEDs are placed in average distance.

2. Resolution Effect:

In real pixel LED display, each LED is dedicated to 1 pixel only. But in virtual pixel LED display, each LED is shared by 4 adjacent pixels at the same time. This combined with the image processing technology improves the resolution of virtual pixel LED display by a theoretical factor of 4 over real pixel led display of same size and pitch.

When showing the texts, the LEDs can't be shared by 4 pixels at the same time. This results in nullifying the Virtual Pixel processing effects. Virtual Pixel is only effective for images.

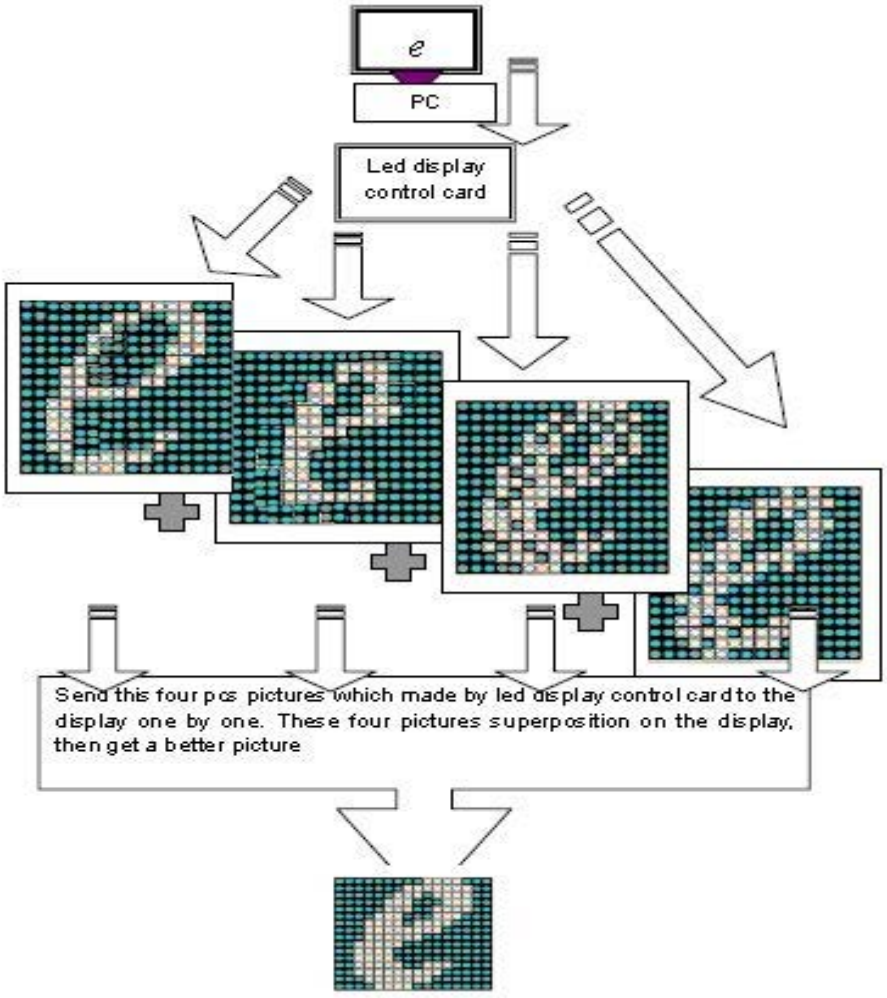
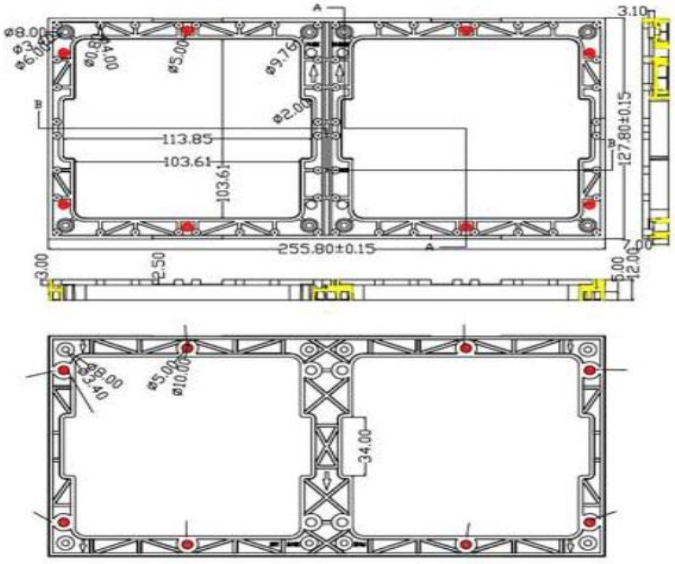


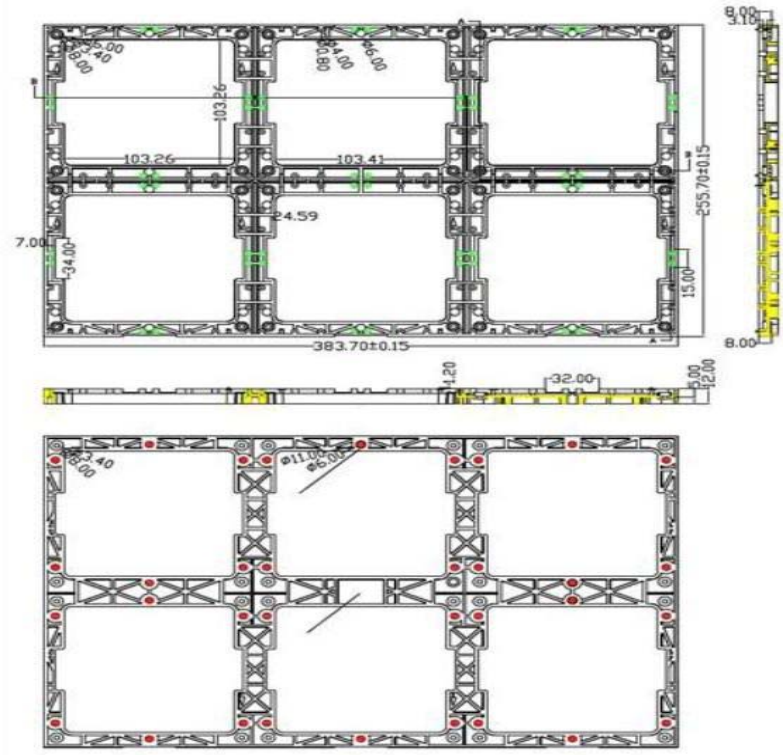
Diagram of Virtual Pixel Processing of an Image (Source: led-displays-china.com)

One World LED PCB Mounting Frame Design Considerations

Following are two different P4 frame designs for support of the same P4 indoor SMD PCB and cover in different quantities.



Mounting Frame of Two P4 PCB Modules (32X64 Pixels) On Cabinets

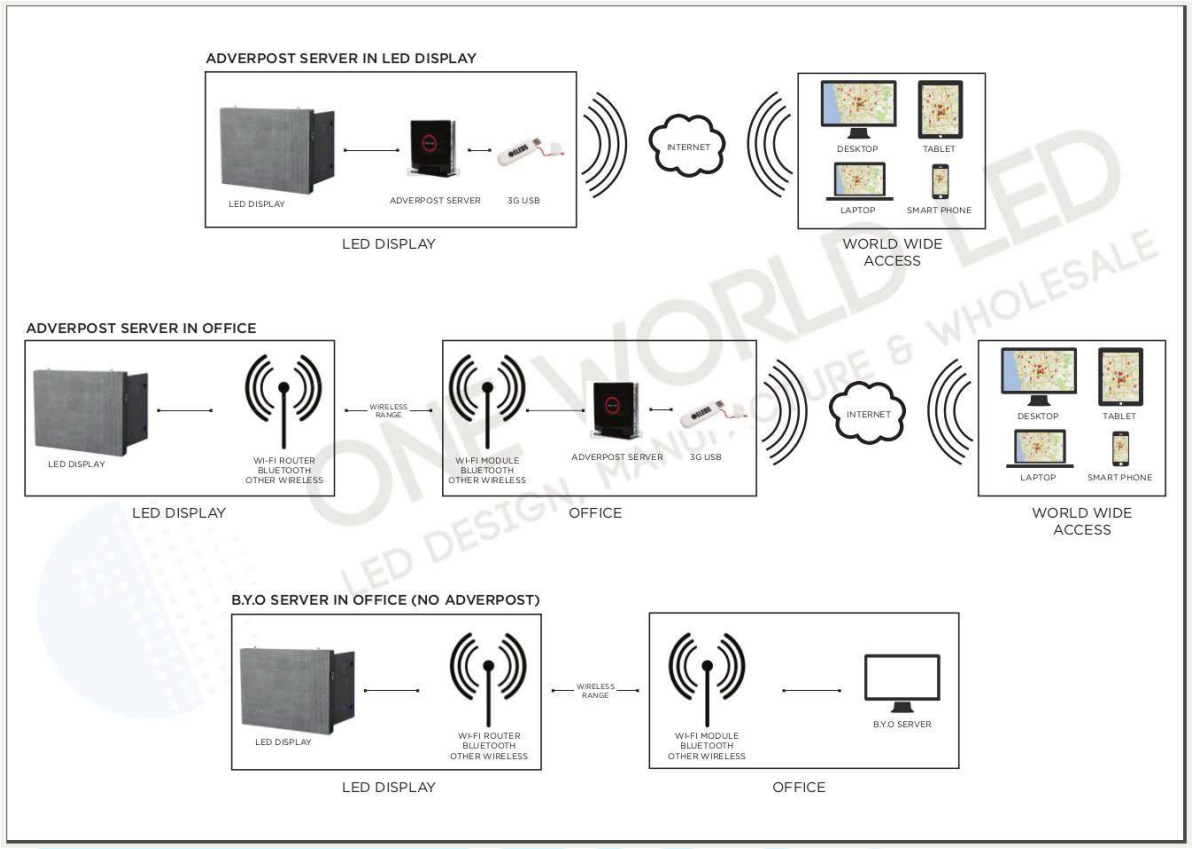


Six P4 PCB Modules (64X96 Pixels) Mounting Frame

The first frame for two modules will simplify the maintenance while the second frame will simplify the assembly at manufacturing. Note - Each diagram depicts all 4 views.

Communication Options

Following diagram depicts the general One World LED display communication options.



The communication options are not necessarily supported by all display

Consult the management software categories section of this handbook to ensure the functional requirements of their digital display can be met with communication option specified and a compatible management software that can integrate seamlessly.

The Communication Options are usually the features and functions of Flash Module Array or LED display controller cards. The LED display controller cards and options are described in the next section. The most important features supported by the communication options is the ability to communicate with hosts and networks for display contents management in some cases referred to as Video Loops or Advertising contents. This communication ability is broadly divided into Synchronous (real-time with computer) and Asynchronous (pre-scripted contents downloaded for off-line or stand-alone display).

Depending on the Synchronous or Asynchronous capabilities of the controller cards (sending and receiving cards) one of the many software and set up programs can be used to set up the LED display features and its operation parameters. Many of the hundreds of the controller card manufacturers provide their own software. The users must take extreme caution in selecting the controller card as many of these suppliers are small and unstable companies and are not expected to survive the shake out.

Synchronous and Asynchronous LED Display Controllers

The operating mode of the LED display is determined by the design sophistication and features of the controls for the Flash Module Array System that comprises the LED display. This control system then can operate in one of the two modes of Synchronous or Asynchronous.

It is important to note that the mode of operation may be independent of communication option used to control the display or manage its contents.

Synchronous Mode Operation

In this mode the LED is coupled with a computer system or server that hosts all the contents and scheduling and coordination of those contents with real-time information on the web or various media such as news, weather, and traffic, emergency broadcast systems, etc.

Advanced Colorlight Synchronous LED display systems can also operate in Asynchronous mode. These systems are designed to revert back to playing stored contents in the displays Flash Array Modules or the receiving cards, either on command or upon loss of communication with the system or the network.

Asynchronous systems may use a Sending card that controls all online operations of the LED display or operate with Sending card emulation programs. The latter method uses the computer platforms NIC card or port for communication with the LED display. The LED display systems utilising the network port of the host or server to replace the sending card is a patented method.

Asynchronous Mode Operation

LED displays designed to operate in Asynchronous mode usually have much less sophisticated design and are limited to special purpose or standalone operation such as single colour LED messaging displays or portable traffic announcement trailer displays.

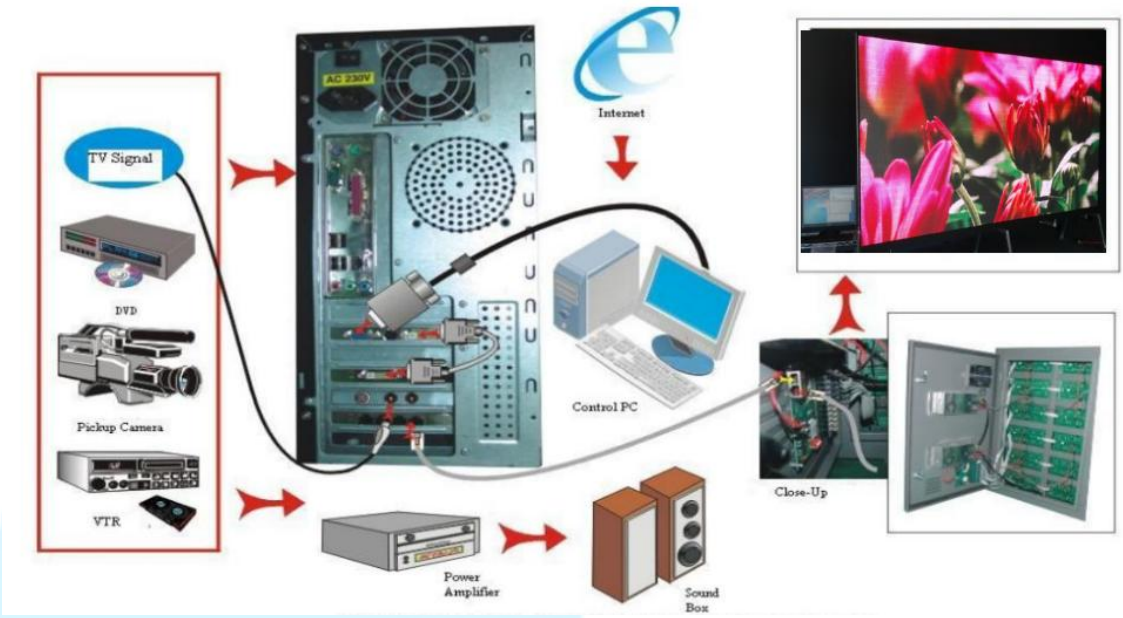
The Asynchronous mode controller cards have limited built-in features that allow scrolling of text, blinking or flashing pre-stored animation characters. These controllers usually have limited number of pixel or matrix arrangements/ As a result, Asynchronous LED displays may not be reconfigured or expanded with the same ease as the Synchronous LED displays. However, for fixed and limited feature messaging displays, Asynchronous LED displays offer a lower cost solution.

Adverclient Control Systems

Adverpost platform supports a variety of Adverclient configurations operating under Linux. Additionally, Adverpost platform allows additional Dealcode streams for transaction processing by LED Screens with users using smart devices. Please refer to One World LED website or Adverpost.com for more details.

Optional Input Devices

In Synchronous mode the solution may incorporate a Sending card[3] and a dedicated server. The following diagram depicts the solution involving a sending card and various input devices that may be used to provide contents to the LED display system.



Various Input Devices and PC Connections to LED Display

Refer to various set up and contents management software user's guide for display management solutions and instructions.

The diagram above also optionally shows an installed TV tuner card so the TV broadcasts may also be sent to the LED display.

Asynchronous mode operation is not suitable for optional input devices and PC real-time input streams, etc. This is a key reason for selecting LED display systems that are designed for synchronous or dual mode operations.

One World LED systems are commonly designed for dual-mode operations. That is online operation using an Adverpost server. These systems may or may not be equipped with a sending card. Dedicated LED displays without a sending card or Flash Module Array System hard-panel use a patented method[4] operation that uses a host-based emulator to replicate the sending card functions.

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3 Sending cards are usually a PCI card that must be installed on a PC with a PCI slot and a free USB port and as shown in the diagram above. Speakers are usually supported by the sound card of the PC, thus an advanced motherboard with good specification and fast CPU can be very helpful for complex configurations.

4 This patented method has been invented by Colorlight which is a cooperating partner with One World Technology of Suzhou. Refer to One World Architecture Primer for more details.

Following diagram shows the features and options of the Adverpost Gold Server hardware package. Adverclient is a packaged control system for the state of the art web-based advertising.

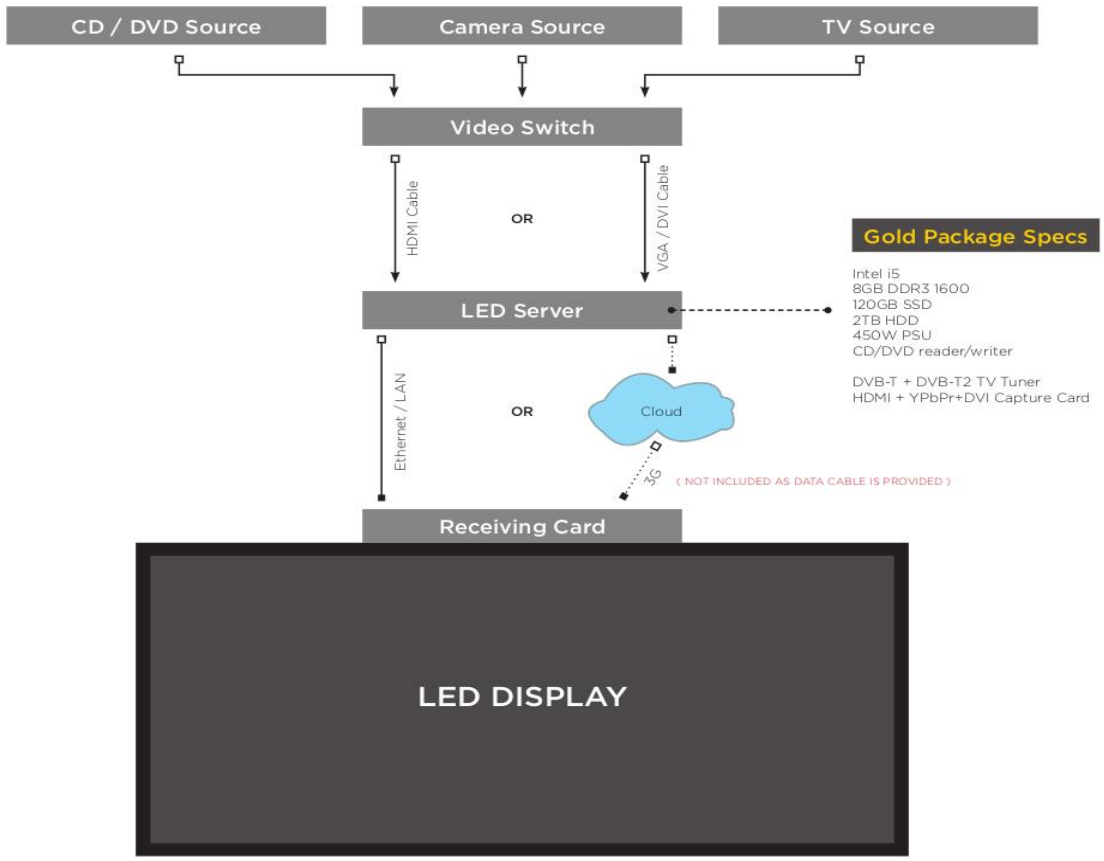


Diagram of Gold Adverpost Server and One World LED Display

LED Display Cabinets and Enclosures Design Considerations

There is a large number of possible Cabinet and enclosure options for each LED display application. However, a knowledgeable user or designer will be able to specify the best solution that meets or exceeds all the application's needs. This specification should be justified by comparison of alternatives and selection of the one that best meets the user application needs.

The various cabinet and enclosure options are designed to best meet the application's requirements such as;

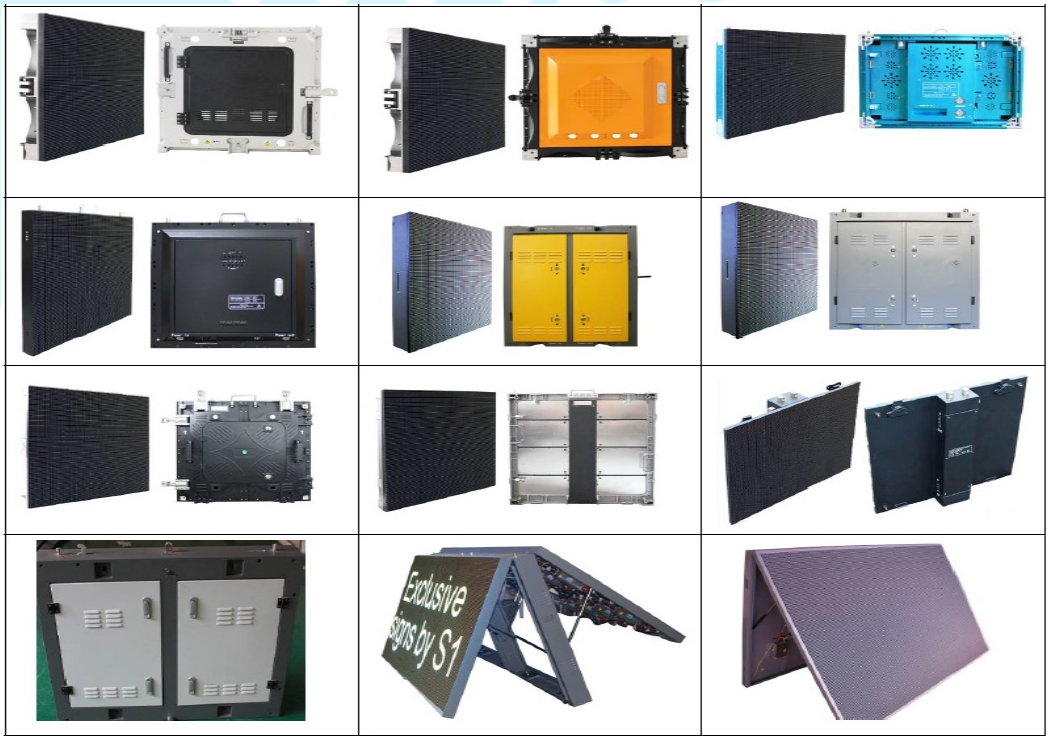
- Permanent or Temporary (rental) installation
- Message or Advertising (Text or colour)
- Single, Dual or Full Colour
- Asynchronous (no Computer or Server) or Synchronous (with Server)
- Fixed or variable with or without real-time
- Fixed or scrolling text
- Fixed or variable picture and video loops
- Real-time feed (news, stocks, weather, direct access for TV news/sports)
- Emergency broadcast and services

- Indoor or Outdoor (protected or exposed to environment)
- Size and Location
- Communication option
    5. Low speed or High speed
    6. Wired, Wireless or Mobile
    7. Periodic, interval or Continuous

Hanging, pole mount, roof-top, wall-mount,

- Viewing range and direction
- Custom and special cabinets and enclosures
    - Car-top
    - Trailer
    - Bus-side
    - Magnetic Mount
    - Building side, Curtain LED
    - Stage and Dance Floor
    - Other Custom Applications

This section details some of the most common cabinet and enclosure options meeting most common requirements listed above.



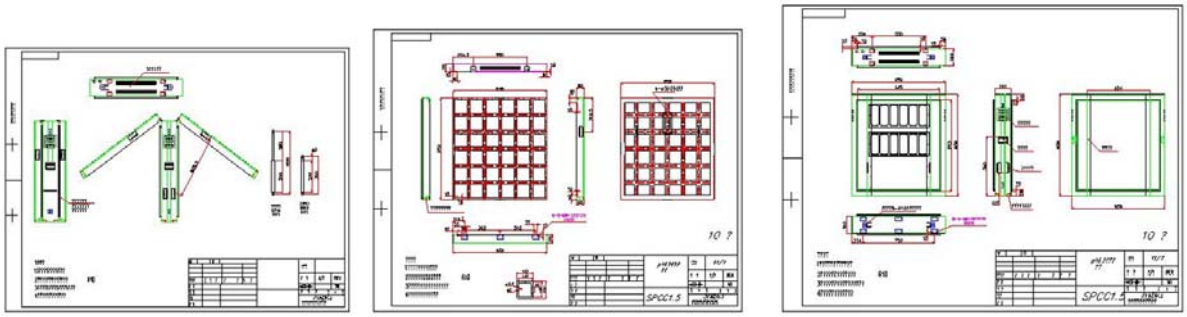
Sample of Standard LED Display Modular Cabinets

NOTE: It is important to order the right cabinet for the application. Some users order iron cabinets intended for the embedded applications for outdoor applications that can best be served by aluminium cabinets in order to save money. This results in premature rusting and damage to the electronics by water permeation because these embedded cabinets are not waterproofed and not coated for direct exposure to

the environment.

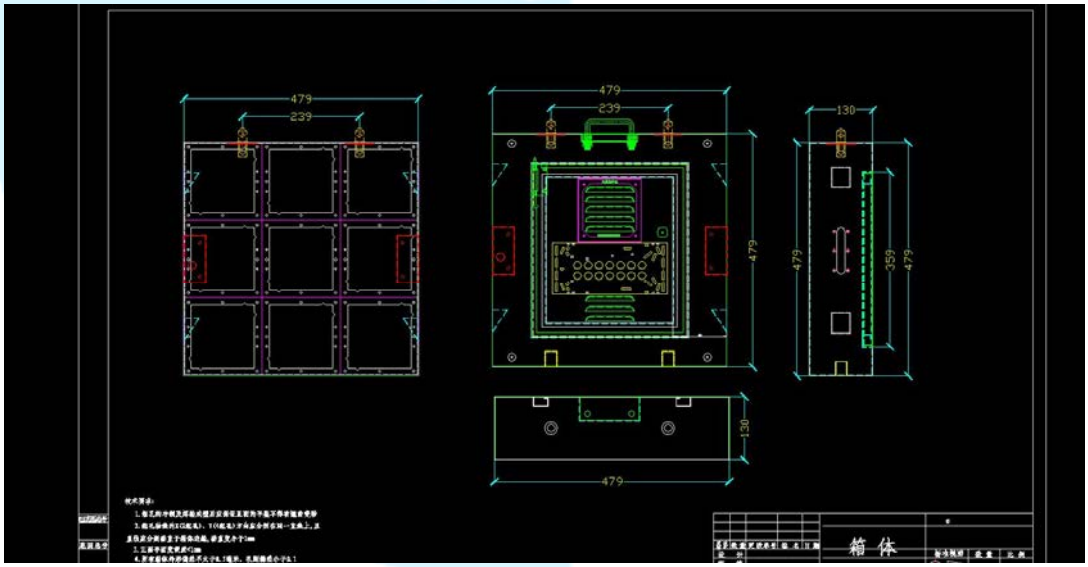
Double-Sided Front-Serviced LED Cabinet

Following are examples of One World LED standard and non-standard LED Cabinets.



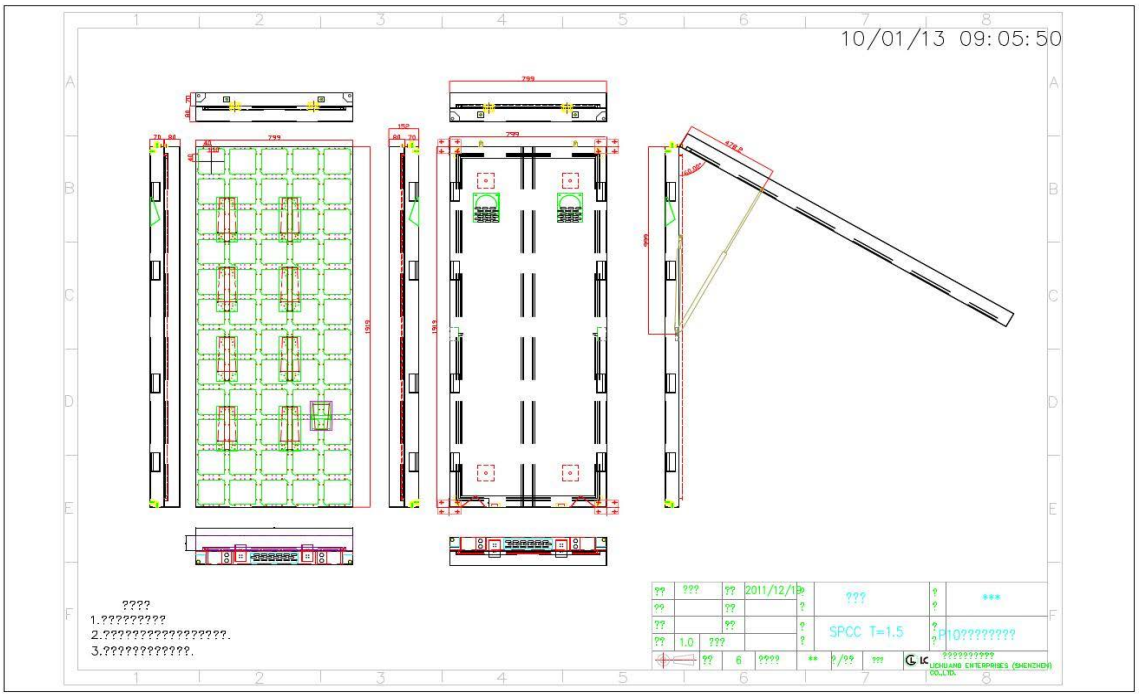
Above - Drawings of One World LED Double-Sided Front-Serviced Cabinet

The standard cabinet sizes can range from 48cm X 48cm to 192cm X192cm. However, it is important to note that the cabinet size is also bound by the number of LED modules that it must support. This results in cabinet dimensions being a multiple of module sizes for the given pixel pitch. For example a 96cm X 96 cm cabinet can support 6X6 P10 modules each configured for 16X16 RGB P10 pixels.



Above - Diagram of 48X48 One World LED Outdoor Cabinet

Another popular One World LED design for Australia is the 1920CM X 80CM front-serviceable cabinet. Following is the One World LED design for this cabinet.



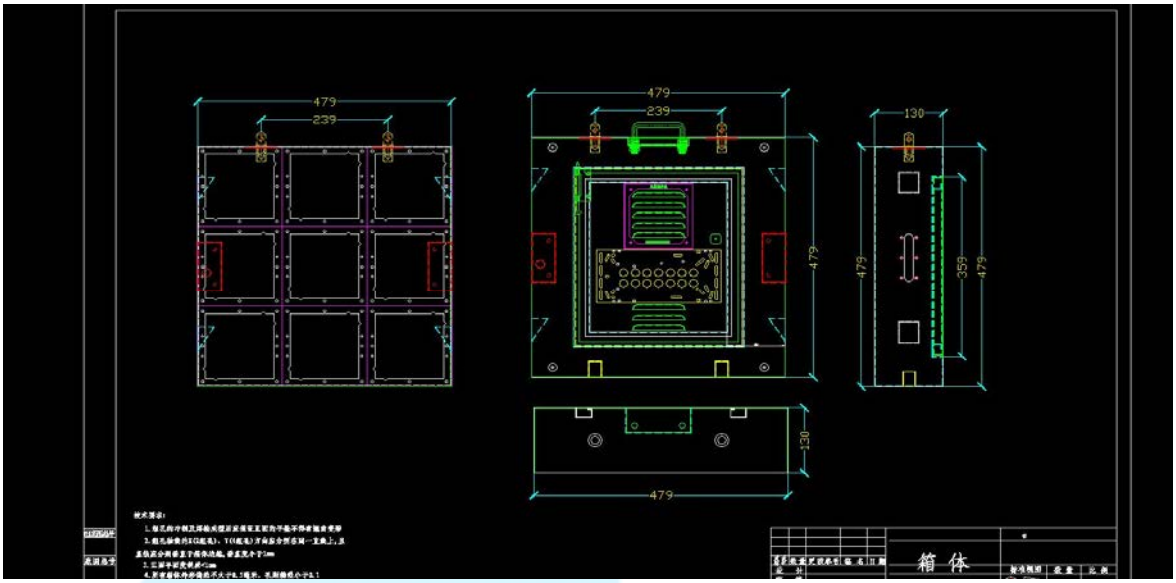
Above Diagrams One-Sided Front-Serviced 192X80 One World LED Cabinet

These cabinets may be wall-mounted in various configurations. One such configuration is shown in One World LED wall-mount diagram below.

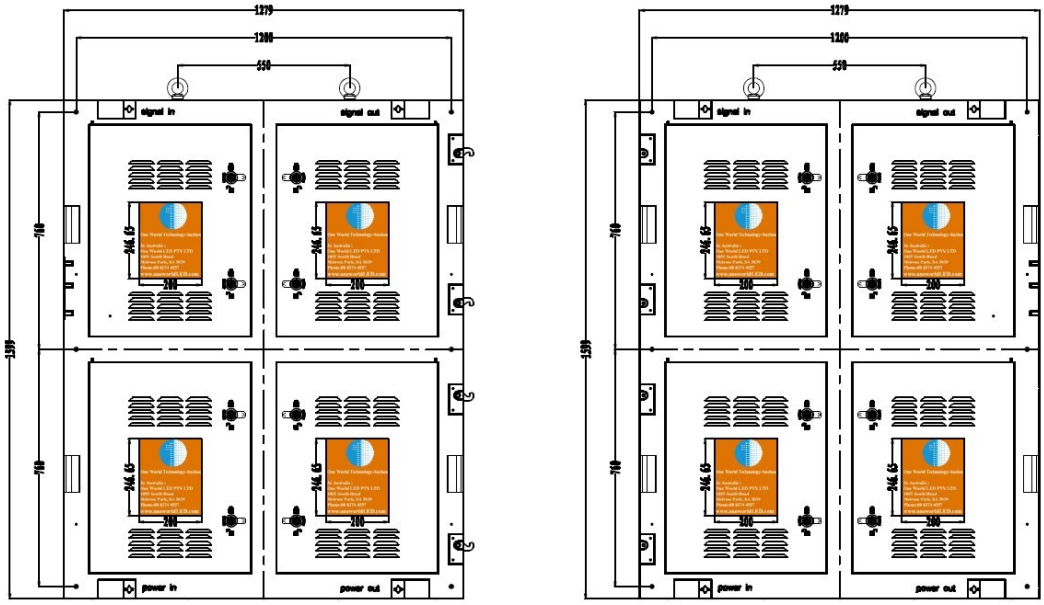
Please note that cabinets for multi-cabinet configurations allow the cascading of power and data cables as necessary to run internal or external to the cabinets.

One World LED Double-sided Front Serviced Cabinet

Following are samples of the design and drawings for special cabinets and trailer mounted outdoor cabinets.



One World LED 48cm X 48cm Outdoor Cabinet

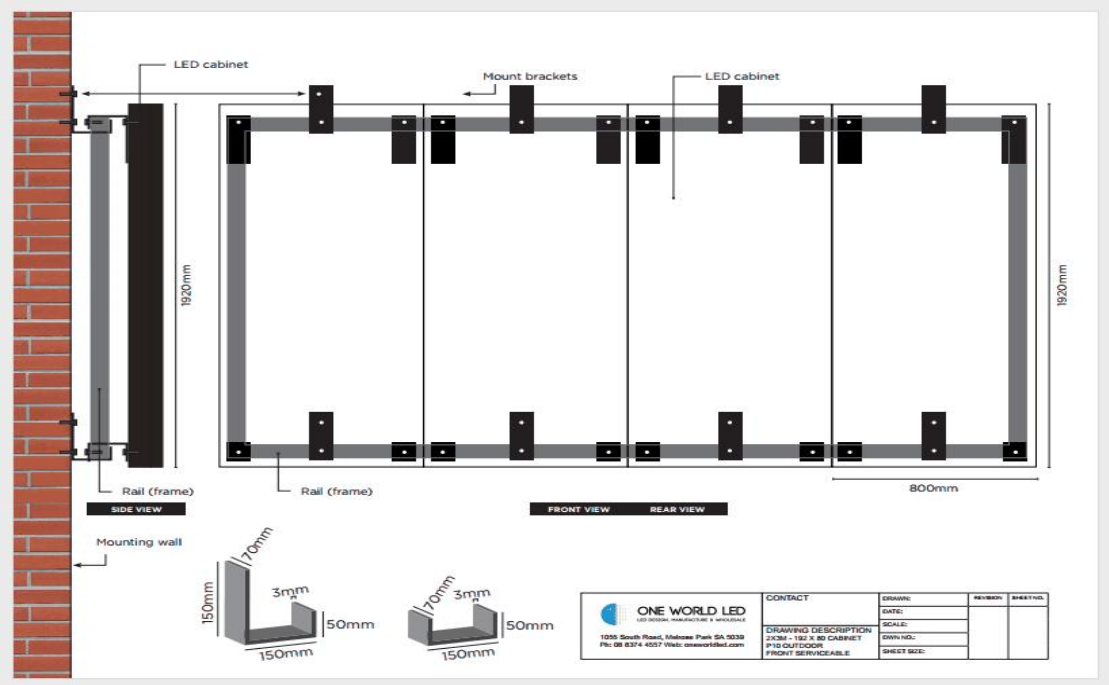


Above is the design of Trailer LED Cabinets

One World LED has a large variety of cabinet designs for various types of applications as shown in this section. For standard cabinet sizes, please refer to the One World LED website. Contact One World LED or see the website for more information.

Installation Structures, Mounts and Frames

The standard display installation options were briefly covered in Chapter 1. Here a more detailed discussion in included for readers benefit. Following outlines the design of a wall-mount installation with a levelling frame to compensate for wall's imperfections.



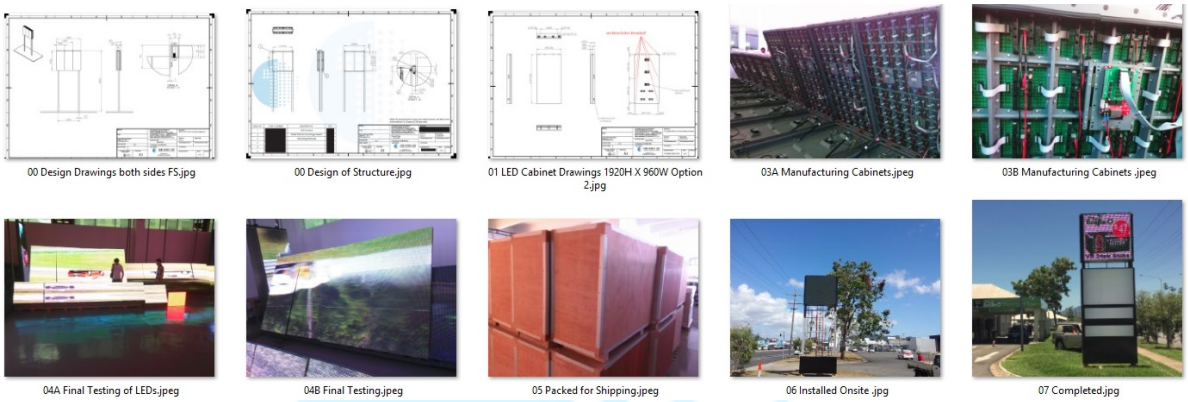
One World LED 192 X 320 Wall-mount Front-Serviced LED display

Note- For wall-mount installations, it is important to consider a hanging frame especially where the wall may not provide a perfect flat surface. The hanging frame which hangs on the wall brackets and provides a basis for hanging the cabinets on the frame. This will allow the LED surface to be a much more even. This design is shown in the diagram above.

Example of Corner LED Display

Some of other One World LED display configurations are shown below for various

application considerations.



Hotel Double-Sided LED Sign- Gallery of Major Steps to Installation

Real Estate Agents and Brokers Office Signs

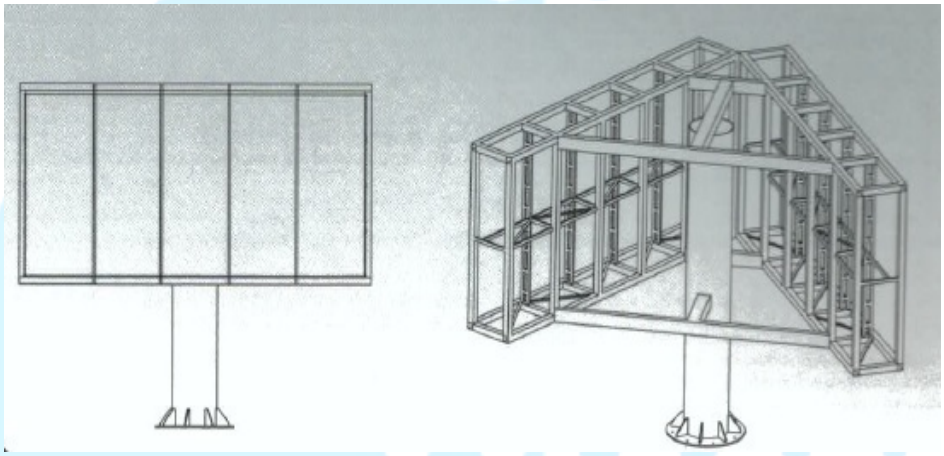
Gallery pictures are provided by One World LED Certified Resellers. Many of the major projects have proprietary designs and drawings which cannot be included in this handbook. Contact One World LED for additional information on any type or size project or consultation or to find local resources for additional service or support.

Billboards and Large LED Signs Designs

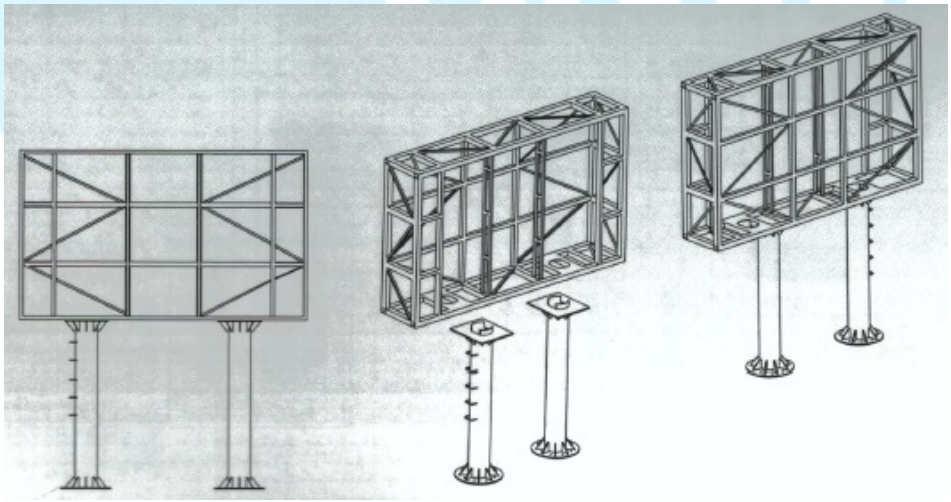
There are many different LED Billboard design systems. These designs cater to various applications which must take into account the location and best use as well as size of screens or screens and their directions.

Following is a sample of multi-direction billboard systems and their subsystems' design considerations.

Single and Multi-direction Billboards Structures



Single Pole Multi-side Billboard Structure Design



Dual Pole Single and Double Sided Billboard Structure Design

Above diagrams show some of the possible One World LED Billboards structure designs. Next, one must consider the design of the necessary Billboard subsystems to meet the application needs.

Billboard Systems and Subsystems

Each LED billboard's main system consists of the following parts:

- LED Cabinet – LED Modules are mounted on the LED Cabinets. Each cabinet also hosts the LED Module drivers and Power Supplies. The Cabinets are interconnected to build the desired size LED billboards.
- Billboard Steel Structure – Poles and frames for mounting the LED Cabinets.
- Billboard Electronics – which includes the server and electrical system for LED Screens
- LED Screens – Screens are approximately L meters wide and H1 meters high and a minimum of H2 meters above ground.

One World LED Base Billboard Models

Model	Length (L)	Height(H1)	To LED(H2)	Pole (H)	Pitch	Type
OWL-26S	6	2	4.5	**6**	8	Single-Sided
OWL-26D	6	2	4.5	**6**	8	Double-Sided
OWL-26T	6	2	4.5	**6**	8	Triple-sided
OWL-39S	9	3	8	**10**	12	Single-Sided
OWL-39D	9	3	8	**10**	12	Double-Sided
OWL-39T	9	3	8	**10**	12	Triple-sided

Note that H1 and L refer to screen height and width while the H2 and H refer to height to the bottom of screen and the total height of the billboard pole(s). Refer to billboards structure checklist in the previous chapter for more details.

Depending on the size and location, the billboard system may also include,

- Content Management System – controls networking, contents, brightness and timing related factors and issues.
- HVAC system – controls environmental and operations related factors.
- Power Management and Control Systems – Allow local and remote management of power, reset and sequencing of up and down.

Billboards Environmental Control Systems

Billboards are the more complex forms of LED systems and they may have multiple screens on each side and multiple sides. The large installations also may require solar panels and HVAC systems for trouble-free operations.

The structure design and construction usually requires various government agency approvals. The construction itself will also require electrical distribution, security, lighting, power sequencing and HVAC control systems. While most of these systems are known to architects and engineers, the lighting and power control system is not well known and understood. Following is one such control system that is optional with One World LED Billboard LED systems. Following is the diagram of One World LED multifunction control card.

Item	Parameter
Temperature sensor	Four probes
Brightness sensor	Four probes
Audio output port	Voice transmission
Relay	DC output current (3A)
	Output voltage (12V)
Power supply	DC 5V
Input port	100M/1000M adaptive
Output port	100M/1000M adaptive

Diagram of One World LED Multifunction Control Module

A multi-function control module enables the LED system features such as remote power on/off control, automatic brightness adjustment and control, delay protection for ascending sequence of LED cabinets' power on and descending sequence of LED cabinets' power off.

Other features of multi-function control include remote voice message as well as temperature and humidity monitoring and reporting.

Following is a diagram of single-sided single-pole One World LED billboard for discussion. Please note that structure housing must be designed to account for environmental requirements of the location and the type of LED screen best suited for the application.

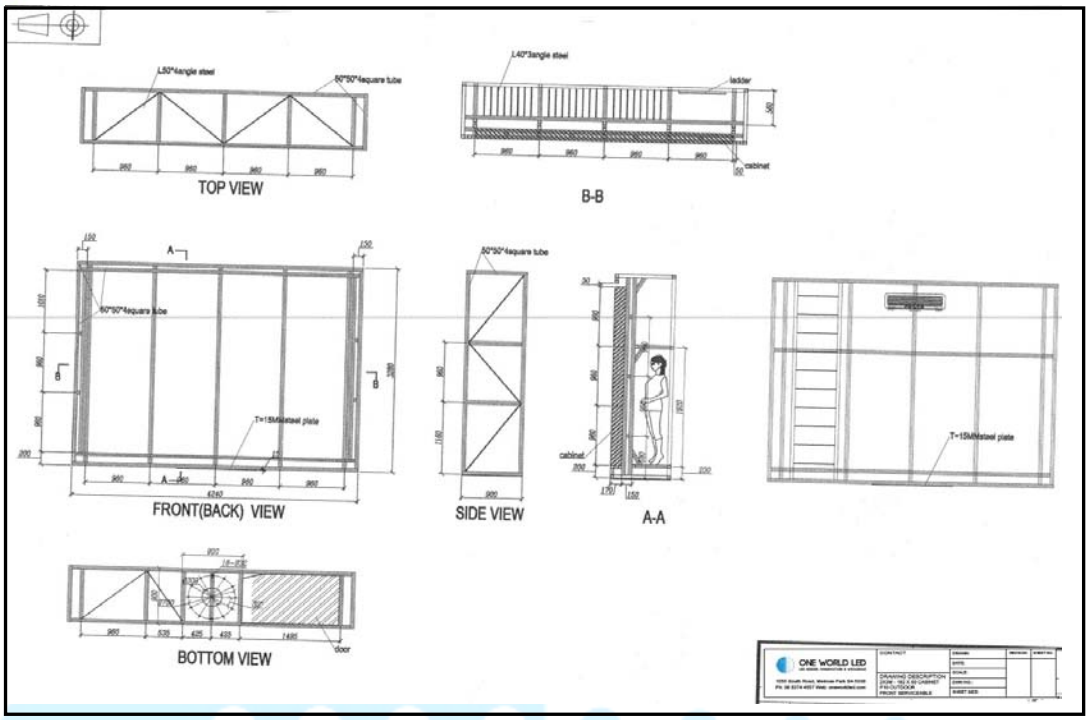


Diagram of LED Screen Part of a One World LED Billboard

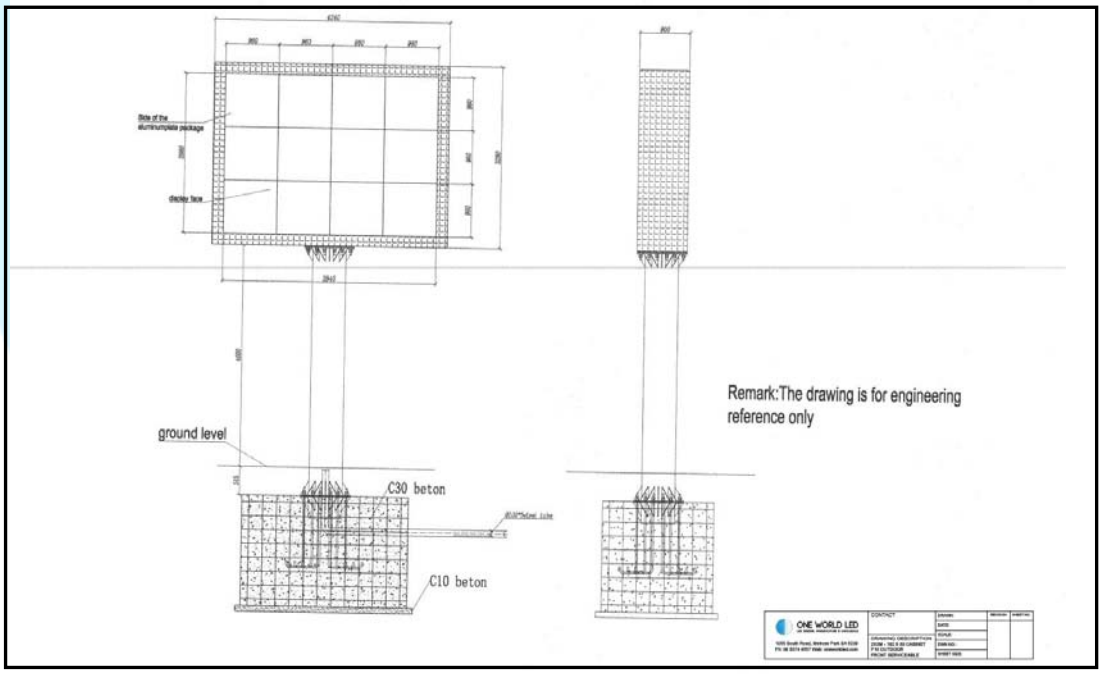


Diagram of Single Pole Part of a One World LED Billboard

Please refer to One World Billboard for more detailed design documentation.

Double-sided LED on single-Pole Structure – air cooled, back serviced

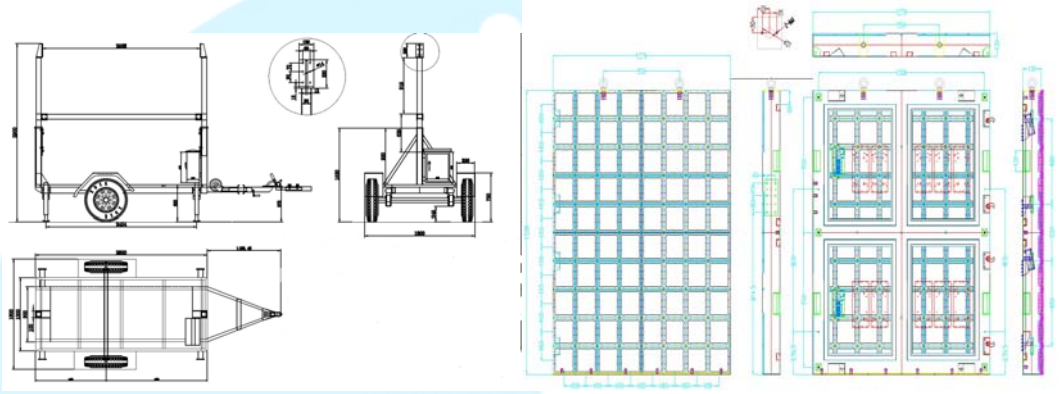
One World LED front-serviceable cabinets can be used for low-profile (depth) double-sided small billboards, petrol station, retail commercial and shopping centre signs.

One World LED Double-Sided Front Serviceable Cabinets

One World Trailer, Truck LED and Bus/Train Design Considerations

There are two basic functional LED trailer designs, 1) Low-end for text/figure notice signs and, 2) High-end for full colour video applications.

The low-end trailers are asynchronous, Low resolution (P25, P30, P37, P40), text based, simple, cheap and suitable for low cost rental events such as roadwork/traffic notices or garage sale and going out of business sales events. These LED trailer designs usually incorporate solar power with battery backup as target locations may not be equipped with power and would require a power generator for short, cloudy and overcast days. Following figure shows samples of these products.



Two-Wheel Simple LED Design & Large P10 Color LED for Trailer

The high-end LEDs usually incorporate full colour high resolution (P6, P8, P10 or P12), synchronous/asynchronous control, with silent generators or extended power cords for direct plug in to the standard wall sockets (10, 15 and 20AMP, 110/220V) and can be used for conventions, store opening, special events, concerts, sporting events and exhibitions.

One World Flatbed Platform LED & Custom Scissors-Lift Trailer LED

Both One World high-end Platform and Custom trailer LED designs incorporate silent diesel generators. The Platform product is designed for rental applications where the trailer unjustifiably increases the cost of each unit. These units are significantly less costly and only one flatbed trailer is needed to transport a large number of units to

client locations. The hydraulic lifts allow simple loading and unloading for installation and removal. These units incorporate Synchronous and Asynchronous controllers for standalone or networked applications.

The classic and economical One World LED full colour trailer which uses standard power extension cord for standard 110/220V power points is shown below.

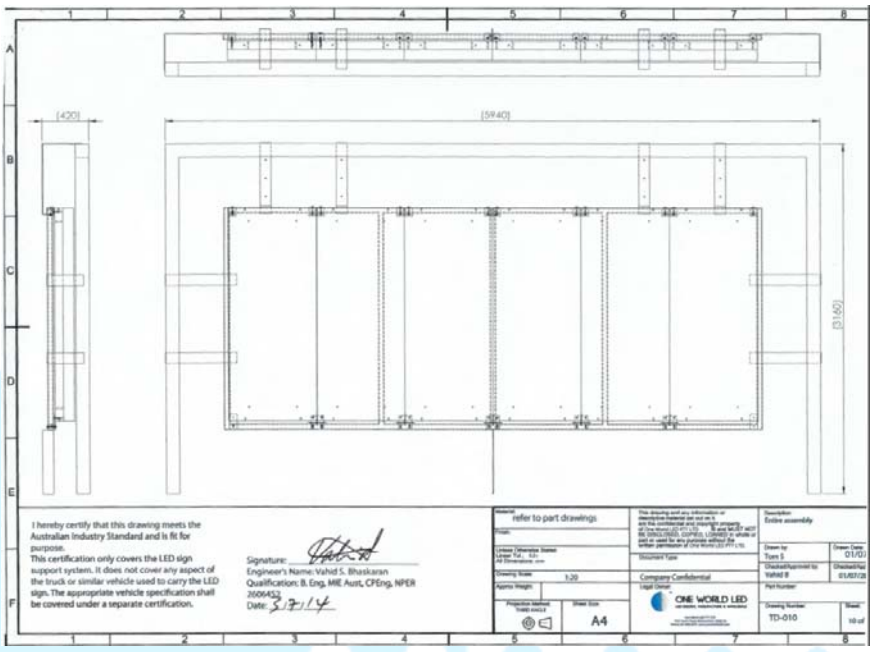
One World LED Full Colour Economical Trailer LED

One World LED has several Trailer designs including very large semi-trailer truck versions for special occasions such as festivals, concerts, marathons, auto-races and other major sporting events. For more information contact One World LED.

Large Custom LED Trailer Example

One World Custom Portable LED Designs

Following briefly outlines the design, construction and complete custom design LED display for an outdoor show and exhibition trailer truck.

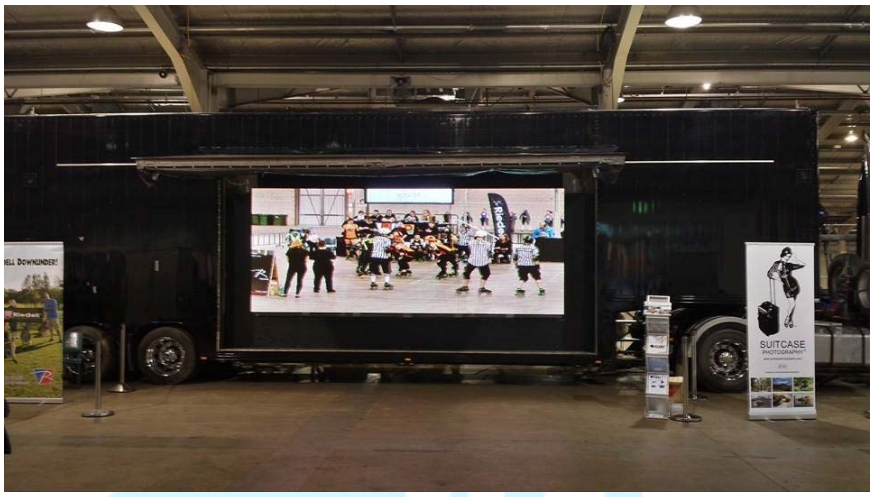


A Design Drawing by One World LED for Custom Trailer LED Screen

The above depicts a sample page from the engineered drawings used to construct the trailer LED display frame and mounting brackets. Below is the photo of the trailer LED frame under construction.

Fame Construction of LED Display Per One World LED Design

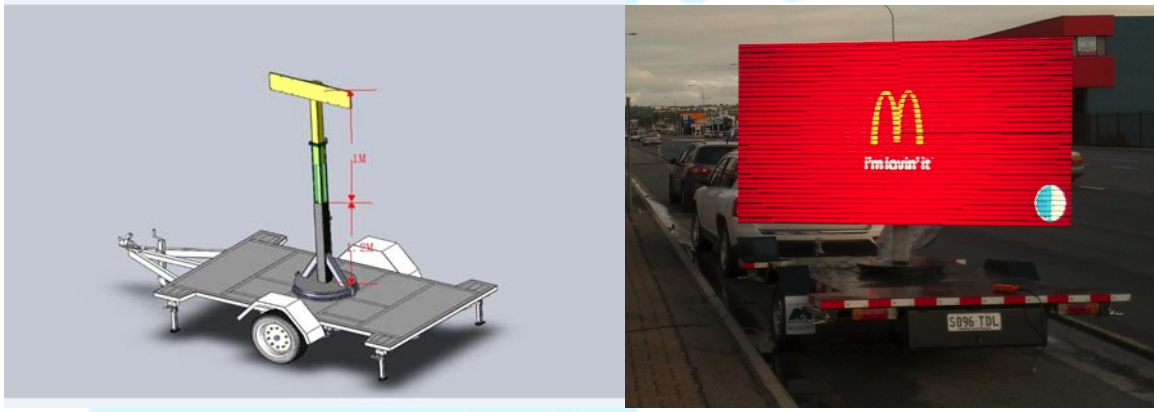
The completed LED trailer is shown in the picture below in exhibition grounds application. Please note that truck and trailer LEDs must be designed with special attention paid to issues of power and portability versus clarity and high resolution for near field viewing to deliver maximum impact.



Completed One World LED Trailer LED Screen on Exhibition Floor

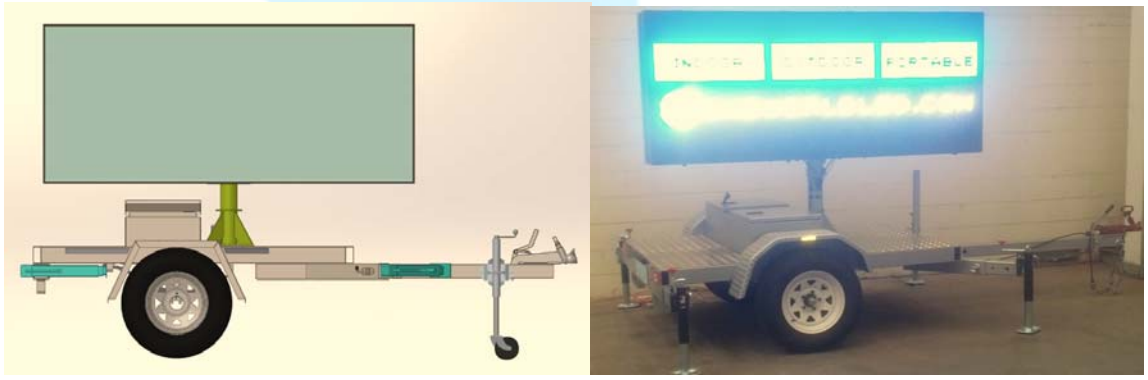
Such products can be a key distinguishing factor in large exhibitions for companies needing to excel over their competition and communicate their product information to the market most effectively in minimum time with the best multimedia tools.

Following are examples of portable One World LED's applications.



Design and Finished One World LED Trailer

One World LED trailer designs and drawings are available free of charge to resellers. One World strongly recommends local construction and testing of the trailer by reputable firms that can easily comply with all the local and national road safety applicable requirements. Following is another example.



Another One World LED Trailer Design and Finished Example

Bus and Train LED Screens

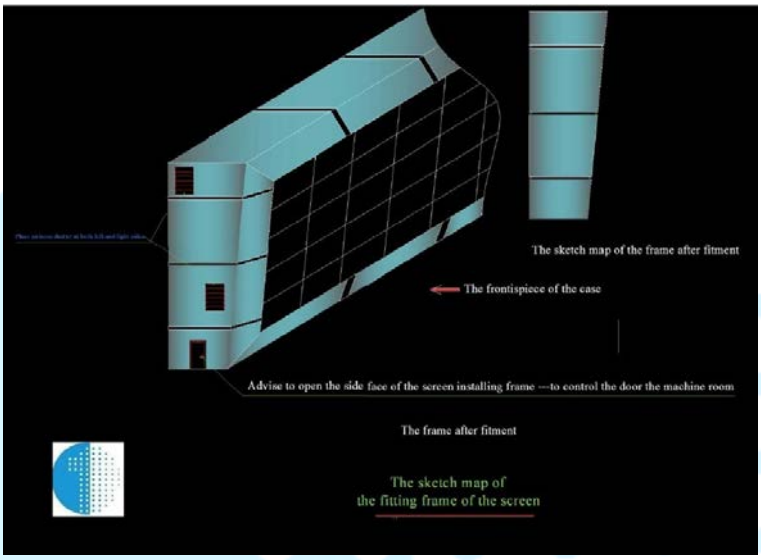
Bus and Tram Side LED Display Screen

Bus and Tram Side LED Display Screen Cabinets

Special Projects and Designs

Today LED screens are increasingly used in commercial structures to convey and communicate the message of the organization to the public and to inform and interact with the community and the market place.

Following is an example of architectural drawings for a mall façade LED display screen.



Partial Drawing of a Façade LED Screen

Following picture shows the construction of the LED in progress. Please note that photos are taken from different angles and show the structure from different views.

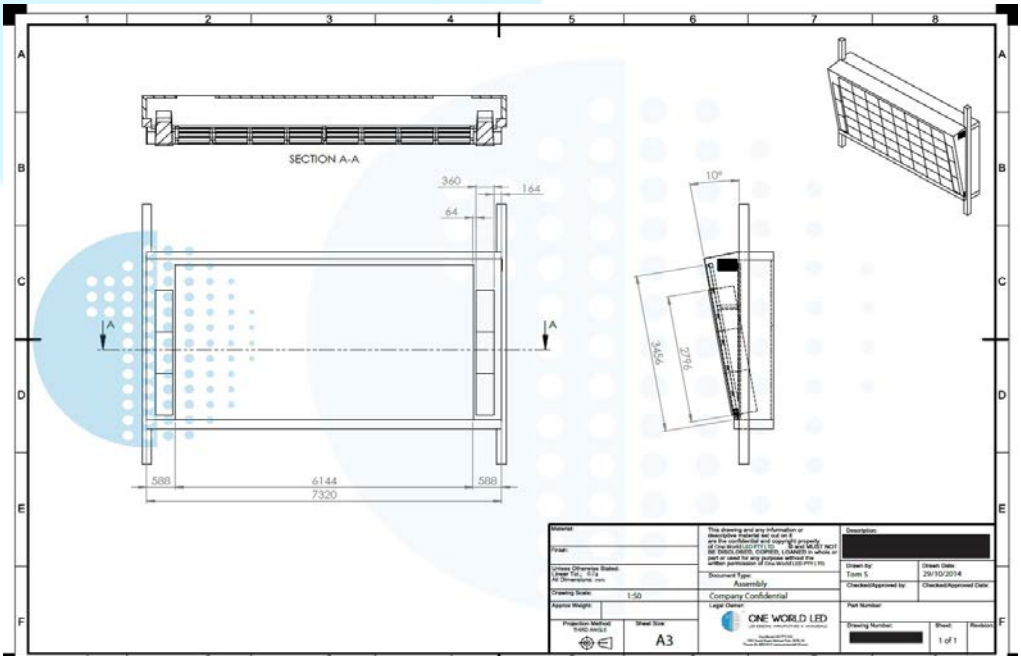
Construction of LED Display Incorporating FMAS Architecture

The above picture shows the ease with which a very large LED screen can be constructed in

place using cabinets as building blocks. These cabinets incorporating FMAS architecture demonstrate the superiority of One World Technology FMAS architecture over the prior art Daktronics method. It is obvious such large screens would have been extremely expensive if not prohibitively costly or impossible to build using single integrated architecture of pre-FMAS invention methods.

Following is a picture of completed construction incorporating a large LED screen.

Completed LED Screen incorporating One World Technology FMAS



Building Façade LED Screen with Line Array Speakers

Refer to One World LED website Gallery for other special projects posted by resellers such as the one shown below.

Mount Carmel College Semi-outdoor Auditorium LED Screen

The Gallery of One World LED Reseller projects include the various steps in the process of that given project. These steps may include mock up, proposal, designs, architectural and engineering drawings, development application and applicable permits, fabrication and onsite construction (mounting and framing), electrical and data, multimedia and sound, and finally the control systems and contents management scheme. Another example project from gallery is shown below.

Curved LED Screens and LED Globes

Curved Movie/TV Screen

Indoor Curved Screens

Curved screens can be built a number of different ways. Most common designs incorporate:

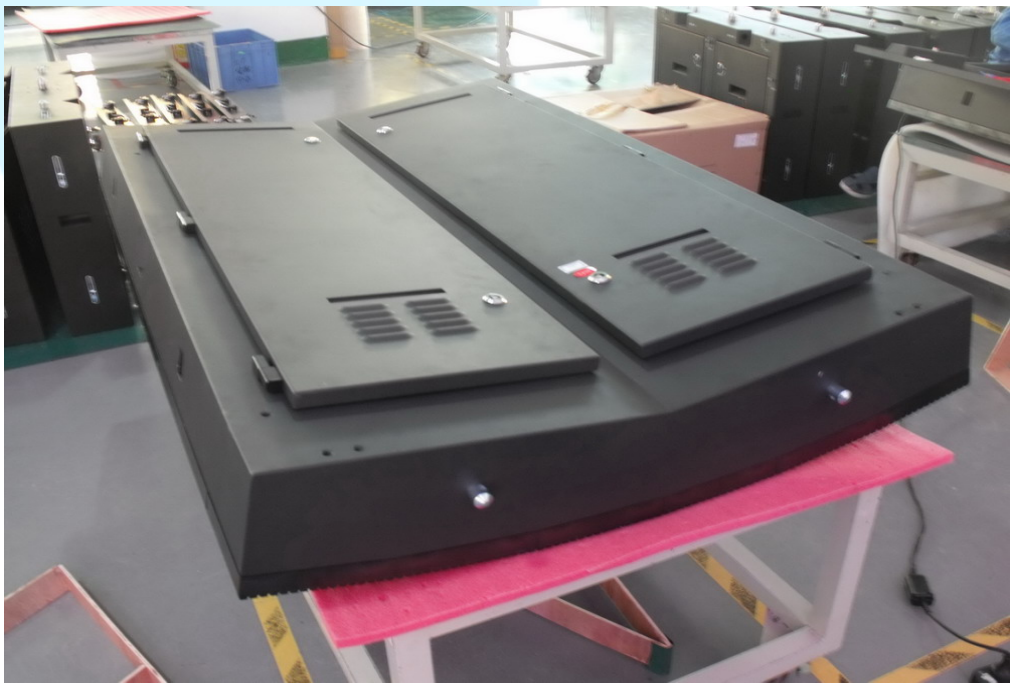
- Standard small cabinets forming a soft curve – used for larger screens
- Using curved cabinets and standard modules to form even a sharper curve
- Using flexible modules to form sharp and multiple curved surfaces.

More details are included below to provide designers and architects with better ideas.

Following picture shows the installation of a soft curved lobby LED using standard modules and standard small cabinets (Shortest width). This technic provides lowest cost option using off the shelf products but can only be used for large screens incorporating a soft or gentle curve. See picture below.

Construction of Soft Curved Lobby LED Screens with Standard Cabinets

Following pictures show the curved cabinets and design of curved LED screens such as column wraps and curved Façade LED screens. Note that these cabinets may incorporate curved and angled PCB mounting frames.



Curved LED Screen Cabinet

The curved cabinets are used for Arc LED displays where they can be accessed from the back for service.

Examples of Outdoor Curved LED Screens with Curved Cabinets

These pictures are provided to assist with visualization of potential applications for new and existing structures and facades.

A Large Façade Framing for Modular LED Screen

A Curved Building Façade LED Screen Installation

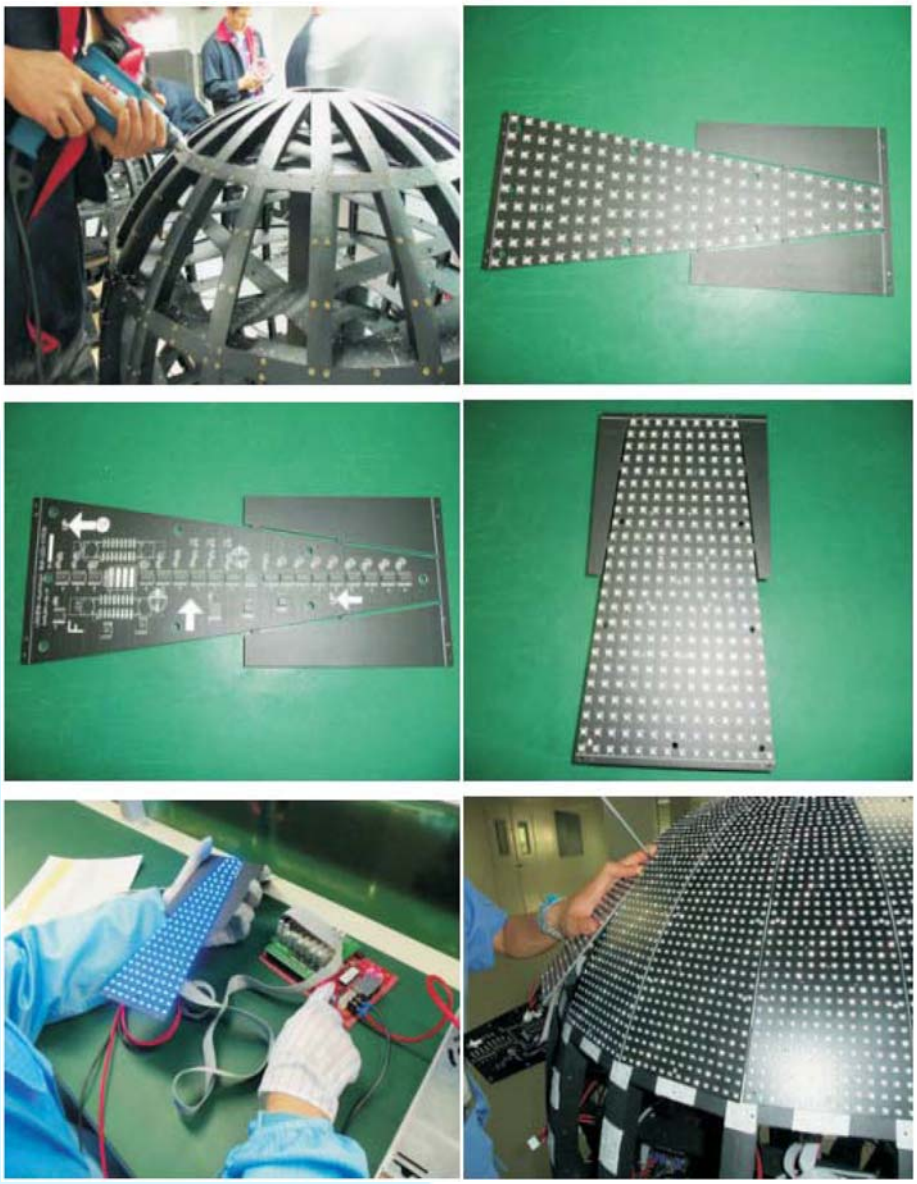
Column Cover LED Screen Using Arc-design Cabinets

Note it is very important not to cover the column deck to deck. At the top sufficient clearance should be provided to exhaust the heat to allow operation within specified temperature range of the LED screen.

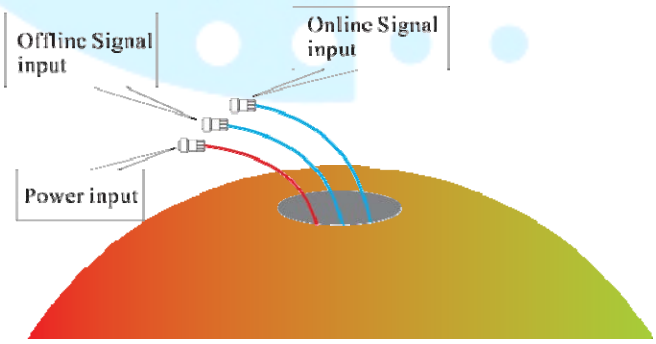
In contrast to FMAS architecture which allows modular construction of large LED displays of various sizes incorporating standardised cabinets, Daktronics architecture display systems are usually constructed as integrated displays.

Daktronics LED Display Manufacturing (Source: Daktronics)

Following pictures show the construction of the various parts of a typical LED globe.



Following diagram shows entry point of the power and data wiring for a globe LED.



All globe LED's incorporate the FMAS architecture and use Colorlight control systems.

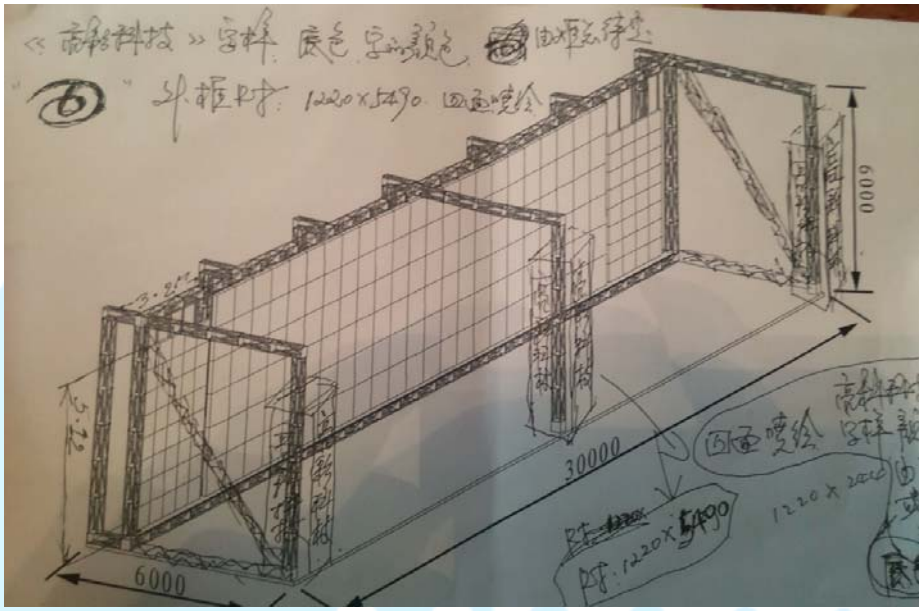
Flexible Modules

Flexible modules are designed for applications with multiple curves and or mixtures of Convex and concave curves as shown in the picture below.

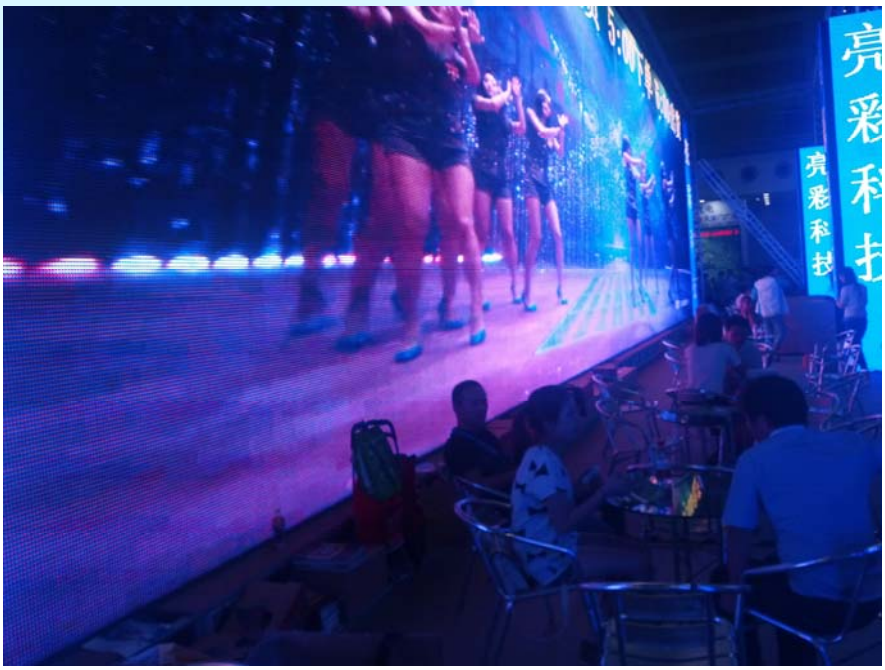
Flexible Module for Indoor Multi-curve Applications

Exhibitions and Shows

Exhibitions are not permanent installations. These projects require strict adherence to the short set up and tear down times of the show organizers. However the reliability and operation of display is of paramount importance and can greatly help or hurt the company's reputation and competitive standing. Following shows a sketch drawing used to erect this Exhibition LED for China's Shenzhen LED Exhibition.



Below is the largest LED display screen in operation during China Shenzhen opto-electronics exhibition per design drawings above.



Above picture shows the outstanding LED screen at the show that amazed the

visitors and crowds at the exhibition using the above design and incorporating the FMAS technology for modular construction of this very large screen in minimum time by few technicians. This screen's installation was accomplished in 5 hours.

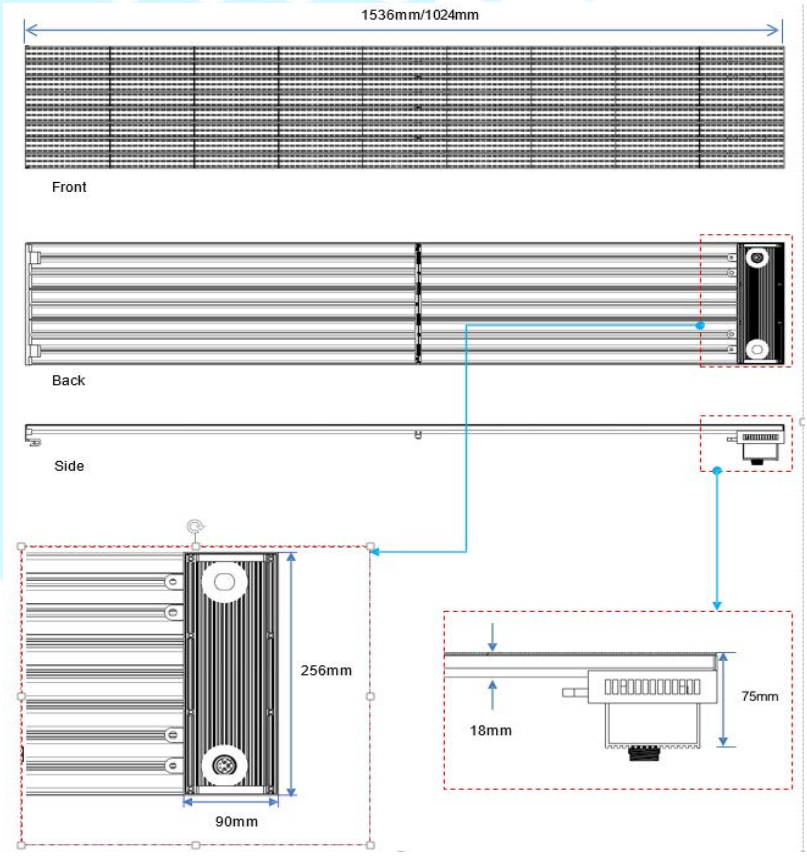
Special LED Products- Mesh, Curtain, flexible and Glass LEDs

Mesh and OWLdot LED

OWL T-BAR Curtain LED

Flexible Curtain

Another curtain product is the rigid T-Bar curtain for outdoor applications.

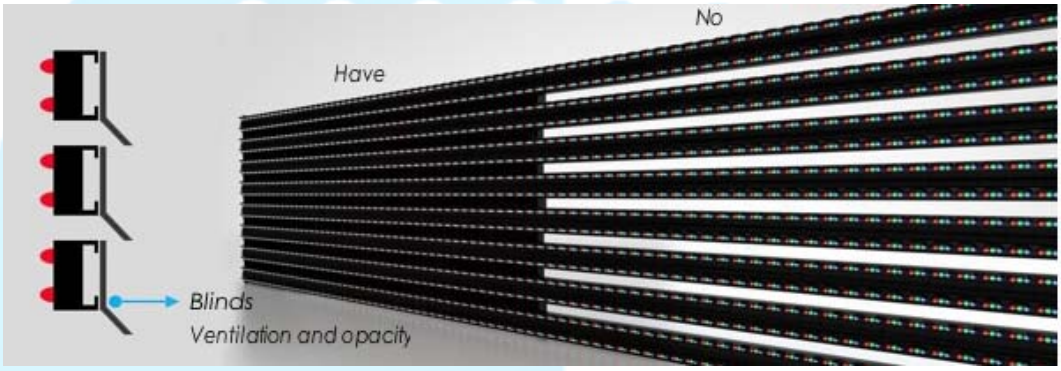


T-BAR Curtain LED Views Diagram

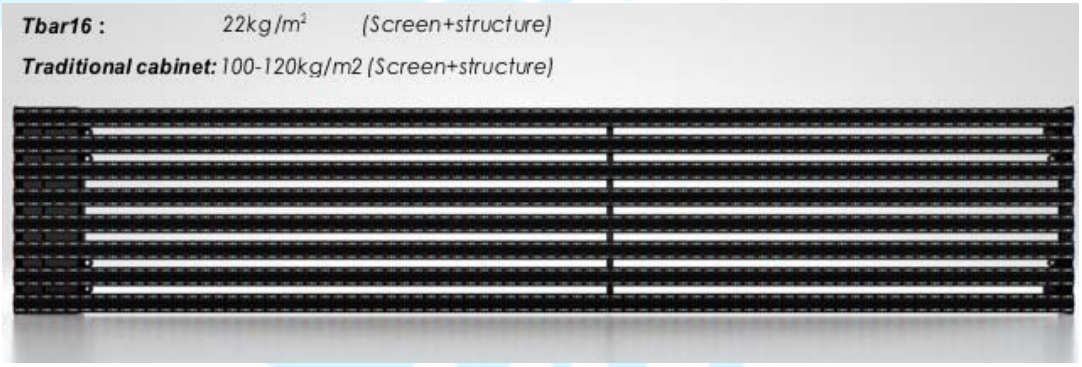
T-Bar curtain is the ideal product for high elevation facades and can be serviced from front or back. This product provides the a light weight, low power consumption alternative for outdoor applications that require high through visibility and low wind-sail factor

Parameter	Tbar-16
Pixel LED Configuration	1R1G1B
Unit Size	1536×256mm; 1024×256mm;
Pixel Pitch	16mm
Resolution	3906 dot/m^2
Resolution/unit	96dot×16dot; 64dot×16dot
Transparency	30%
Brightness	≥7500 nit
Weight	18kg/
Max. Power Consumption	400w/ m^2
Stick Permutation	Horizontal/Vertical
Viewing Angle	H120° /V60°
Ingress Protection	IP66

T-BAR Typical Specifications



T-BAR Vented Module



Typical Weight Compared to Regular Iron Cabinet

Most innovative LED structures have been designed by One World LED incorporating T-Bar curtain LEDs for Sky High Branding. These designs will be available to One World LED authorized resellers for high exposure sites and extreme heights demanding low sail factor LED screens.

One World LED Showcase Products

The Showcase LED products are elegantly designed LED screens for both indoor and outdoor shopping-mall and retail advertising applications. The specific applications may include cosmetic department, home furnishings, office furniture, computer store, auto-showroom, financial centre, travel agencies and so on.

One World LED Showcase **& One World LED Grand Showcase**

These products are designed in two models of Showcase (1M W X 2.5M H) and Grand Showcase (1.6M W X 2.5M H). Both models are available in P6, P8 and P10 indoor and outdoor (SMD) versions.

1. Most attraction form of advertising with Adverpost.
2. Metal frame with highest quality One World LED modules.
3. Elegant and practical look, easy to install and change displays.
4. Excellent outdoor performance for shop/boutique windows.
5. Bright LED light source, safer and with longer service life.
6. Remote and scheduled contents and brightness control function.
7. Optional speaker for stereo sound support.
8. Optional Plexiglass lockable cover doors.
9. Standard power plugs for indoor and outdoor 110 and 220V usage.
10. Applications: merchandising, hotel, cosmetics, studio, company, exhibition halls & roadside, traffic notification, etc.

These products are ideal for multiple location networked applications with Adverpost such as fashion and cosmetics, real estate agencies and government public notice and education applications.

The high-end commercial packages are also available in single or double-sided

configurations. See some of the various packaging pictures below.

Showcase Commercial Application

Showcase Single-sided Front / Back and Double-sided

The fact that a large number of these showcases can be supported by Adverpost as private network or publicly accessible V-Commerce agents allows application in dual local and national or global mode where local offers and adverts can be mixed in a loop with other national and international campaigns to promote global, national and local brands and offers concurrently. Refer to Adverpost and Showcase products brochures and specifications for more details.

Chapter 3 – One World LED Display Systems and Software

LED Computer System and Software

LED display contents are normally produced, downloaded and or updated using a computer-based system or a host. This information and contents are delivered through a wired or wireless connection locally or over a network, including Internet.

Of course the key element in this environment is the LED displays capabilities discussed previously. Chief amongst these is the full colour modules and flash module array system commonly referred to as Sending and Receiving Cards or LED Controller Cards. The receiving card(s) determine the operating mode and features of LED display.

Operating mode of LED display can be Synchronous, Asynchronous or both. Synchronous means a computer system is continually driving the display like monitors. Asynchronous mean the control cards periodically are connected for update of flash module array contents. Once the update is complete and verified the control cards simply loop through the data or proceed to display them as scheduled with no real time or network operations capability. are operating the LED display independent of any computer systems and networks.

For LED displays operating in asynchronous mode also called off-line mode any computer may be used to connect to display that can “connect” to the display through its supported communication option. No dedicated computer is required. However for synchronous mode operations a computer is required to be connected to the display.

Normally more sophisticated LED billboards and and screens have a dedicated system which is not only used for delivering real-time video, audio and contents but it can also allow access via Internet. In some cases, these dedicated computers may also be equipped with TV capture cards and or other peripherals for live camera input and streaming video.

One World LED System Configurations

One World Led offers three models of computer systems especially designed to support various applications and operation needs of LED displays and billboards. These three models are,

Silver – Economy packaged system for large multi-side LED displays with Adverpost.
Gold – Full-featured Led server with Adverpost to manage multiple display billboards and screens with live feed support.

Depending on the targeted functionality, these systems provide a migration path for more sophisticated use and application of Led display systems.

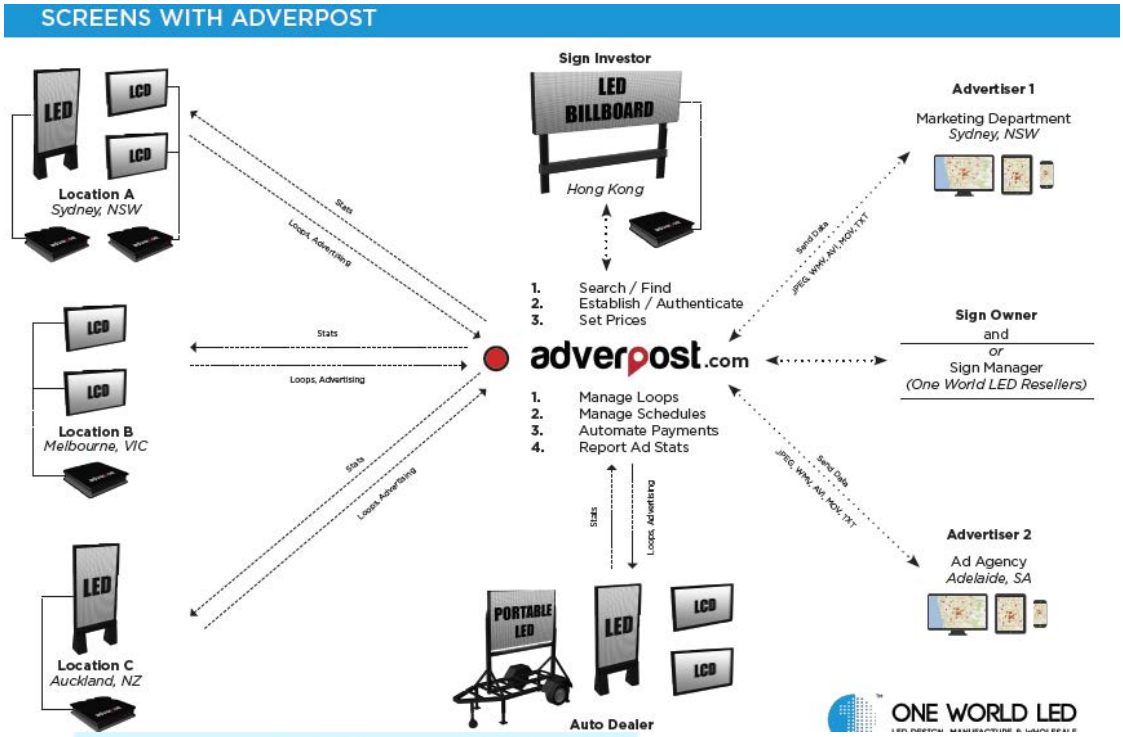
These systems are pre-configured with open source software or MS Windows as needed and are supported by One World LED.

Software Options and Contents Management

The One World LED screen may be supplied with software utilities depending on customer needs. Resellers offer many different types of management software depending on customer application. The management software categories and applications include;

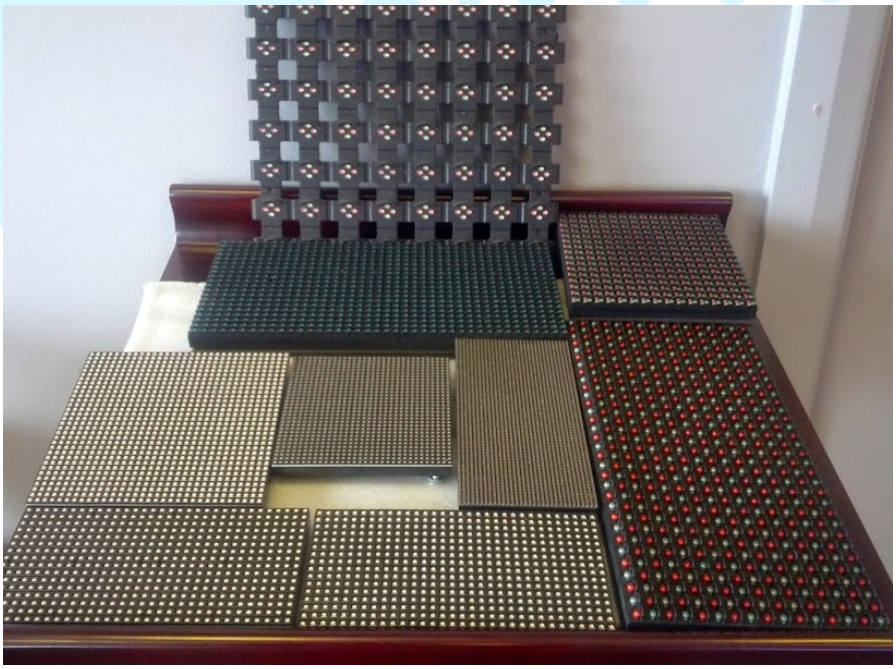
Internet/Server and Host-Based Advertising and Contents Management
Adverpost – Available from One World LED and Elite Marketing
Nexus Domain – Available from Cisco for Minimum of $50,000/License
Scala – Available from SCALA – average cost of $1000/screen/year
Others such as Lyrebird, Stinova, Morphead, Gatemedia, etc.

Local Display Setup and Management Utilities
LEDShowT9 & LEDVision - http://www.lednets.com/en/ Color Light
LEDStudio - http://www.linsn.net/ Linsn Technologies
LEDEditor & LEDSET - http://www.ledsign.cc/ Xixun Electronics
LEDCenter – Good for text based single colour message boards
LEDArt – Shenzhen Huidu Technology
Others for text based and other messaging and display applications.



Adverpost configuration Block Diagram

Following is a summary description of the LED display Set up and contents management software and utility packages.



Assortment of LED Modules showing P3 to P37

Adverpost

This is a global display device locator and contents management software package by Elite Marketing that incorporates patented technologies for digital display listing and location, cost comparison tool, as well as contents management for LED/LCD devices using patented IPAM/Adverpost innovations.

This software package facilitates loop scheduling and editing as well display query to show all locations a given advertising or display file is being presented with corresponding schedules. It is the most comprehensive new tool for digital contents management with significant upgrades and enhancements for future expansion.

Adverpost is available at One World LED, Elite Marketing or any of the qualified resellers.

Lyrebird

This is a Kazo product. This software is a networked LED Display contents management system that allows remote operation and script preparation (display loop editor) and scheduling for a number of LED and or LCD devices. For more information refer to the link http://www.linsn.net/

This product is available and supported by Kazo business partners.

SCALA

Is one of the oldest contents/media management utility for creating, scheduling and remote management of display advertising loops it refers to as “Playlists”. This package was originally designed for LCD display networks and is best suited for that environment.

SCALA file management database allows organisation of media files by various attributes such as filename, file type and metadata. User must select the data base that best suits his or her environment like MySQL, MS SQL or PostgreSQL. The cost per display can run in excess of $1000 per display per year.

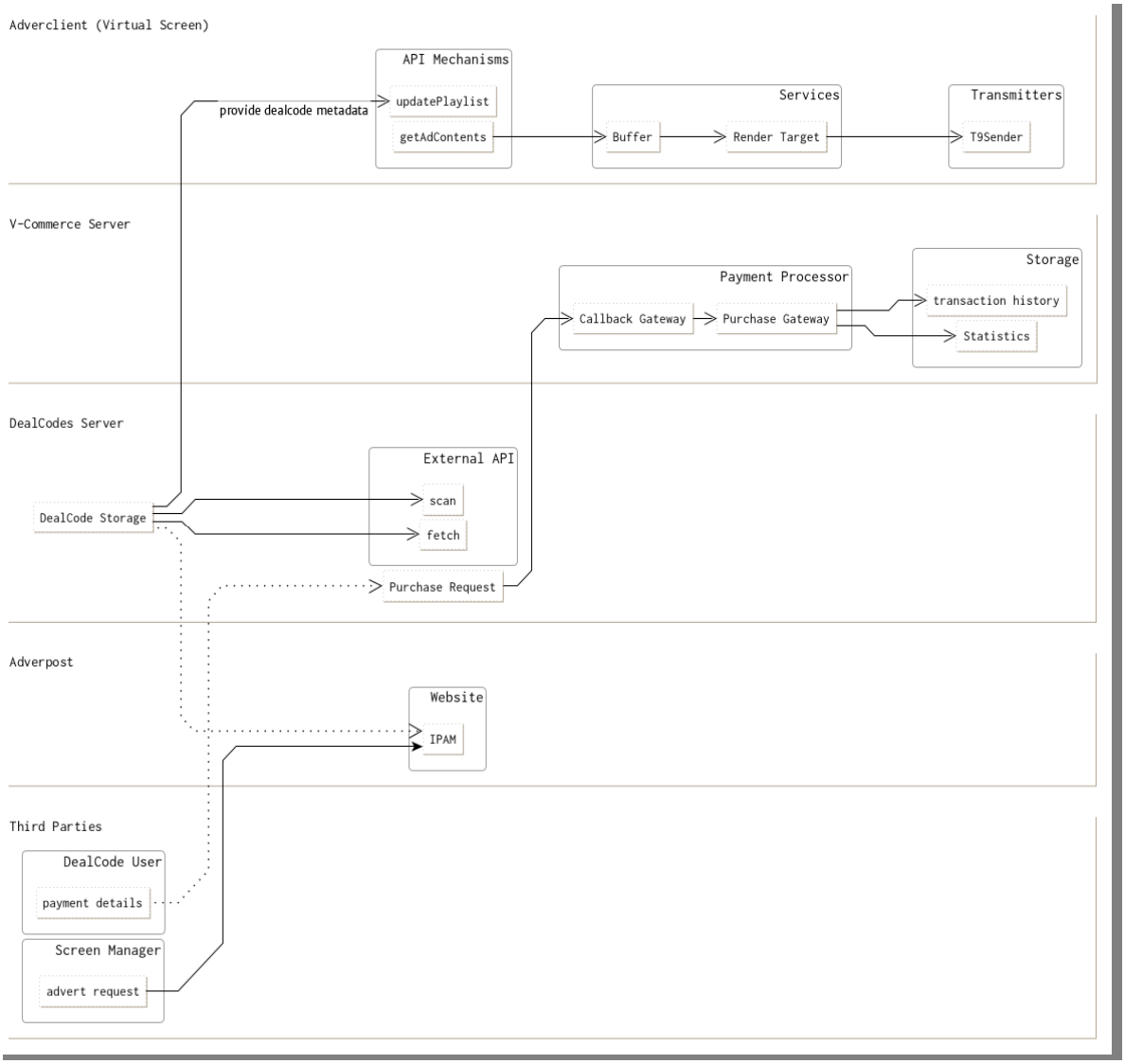
For more information contact Scala.

Another open source media-player software that is used by digital advertising media companies is Xebo. This product id offered for free but the storage space to be allocated for the adverts is charged on monthly basis as cloud storage for rent.

“Key V-Commerce Contributions” by One World Technology

One World has innovated in the area of V-Commerce. That is, V-Commerce as virtual point-of-sales platforms, direct and indirect methods of product sharing and display and other various forms of virtual management of commerce. One World has also innovated the transactional methods for virtual POS systems and provided backwards and forwards-compatible methods for interaction with said systems.

One World has devised methods for representation of outputs as scalable, encapsulated, “*render targets*” which allow for placement-aware and context-sensitive “*virtual objects*”. For example consider the Dealcodes system in practice, which in standard implementation will be treated as a *virtual object*.



In the above diagram you can see how the metadata-laden virtual object is told to represent itself as

a Dealcode object in the render target of the Virtual Screen. The displayed object would itself contain encoded metadata appropriate for the display purpose, or in this case, identification of the Dealcode id. An example depiction below shows the Dealcode object in action encoded as a QR Code:

Interaction of this object with an end-user device such as a mobile phone or tablet requires computer vision or audio recognition technology. Therefore scrambled-PWM technology is crucial for removing roadblocks regarding the timings and processing speed of mobile device cameras.

The appearance of a Dealcode is not limited to QR Codes, as the object itself is not defined by the image but rather the metadata, it would be possible in future to display Dealcodes which make use of other features of LED Displays such as light pulse encoding, stenography, and other light-based interactions.

After the effect of an interaction with a Smart LED Display to retrieve metadata about the virtual object being displayed (which may link to any of the types of "*deals*" as described in relevant documentation), the V-Commerce servers linked to the mobile application may begin to interact with other servers using the metadata pulled from the LED display.

In turn, the Smart LED Display itself may interact with those other external systems or the mobile application for the aforementioned V-Commerce methods.

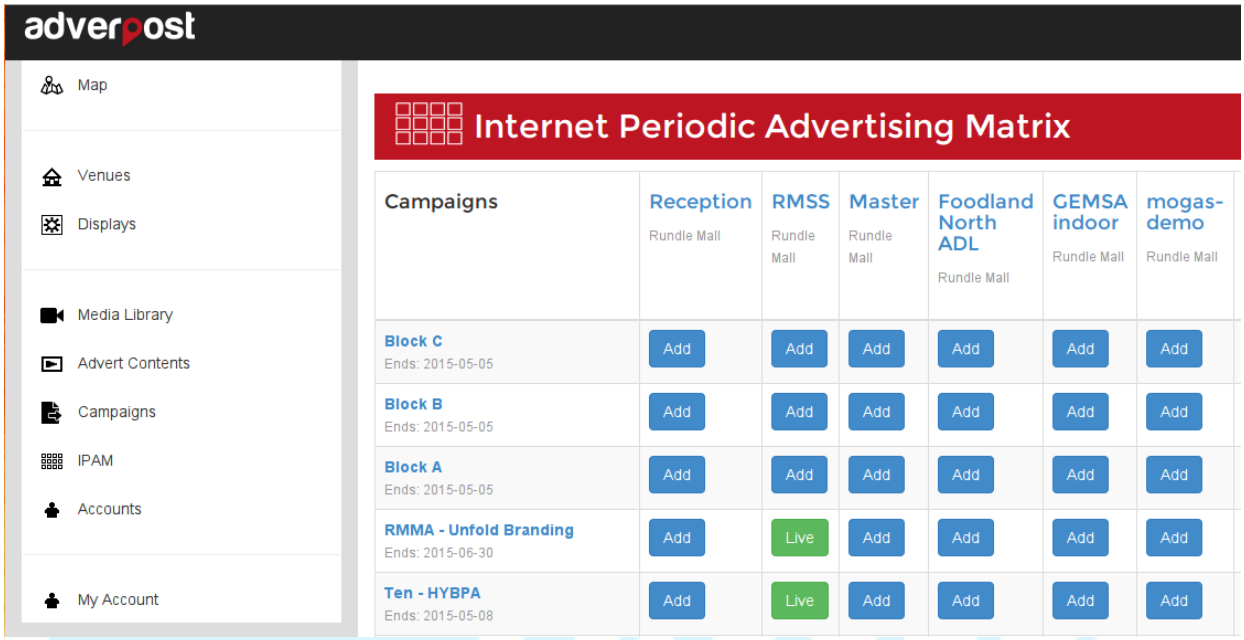
To summarise, One World has made the following key contributions to Virtual Commerce technology:

- invention of transition method for enabling interoperability with existing services
- invention of interaction methods with said virtual objects
- invention of a dynamic referential object for forward-identification
- invention of method for display of virtual render targets on existing LED products

IPAM Overview

IPAM (Internet Periodic Advertising Matrix) is a subsystem of the Adverpost dynamic content management/advertising system. IPAM describes an interactive system which serves to function primarily as high-level overview/interaction tool with remote objects, typically LED screens or groups of LED screens.

IPAM's primary view is intended to be that of a 2D grid wherein the rows represent actions or contained actions and the columns represent the target cluster or specific remote object. See the image below for example:



Here we can see IPAM being employed as a "Campaign Manager", but in previous and alternate versions IPAM may have been employed for other types of actions, e.g. power management, third-party integration, etc.

In some cases IPAM may only present a statistical view for analysis or plotting of future slot modifications. These features are not depicted.

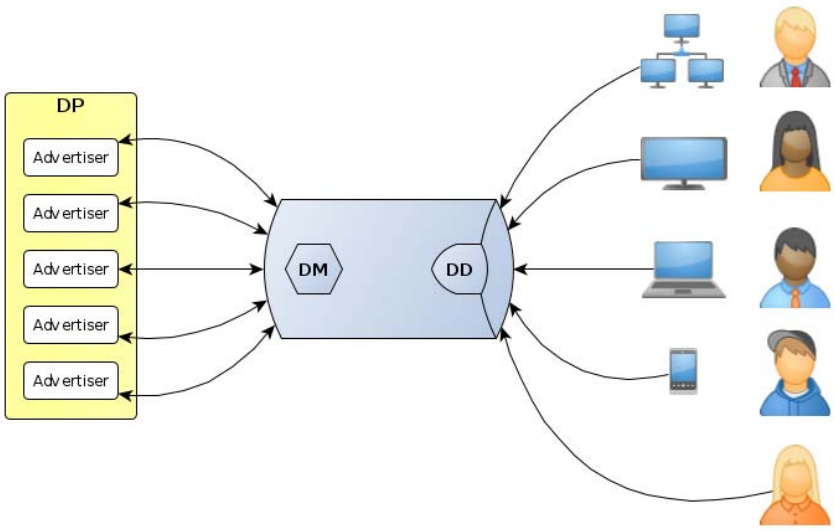
IPAM's object slots are intended to be inclusive of objects shared or incorporated by other users of the Adverpost system, such that by interaction with each other's shared objects through divvied slots actions such as purchasing of time or availability of a given slot can be made possible.

The next planned embodiment of IPAM is that of a 3D matrix, wherein each "action slot" (Add/Live depicted) represents a loop of other potential actions, the ordering or execution of these actions being dependent on the implementations' requirements.

Some possible examples of these determinative orders would include:

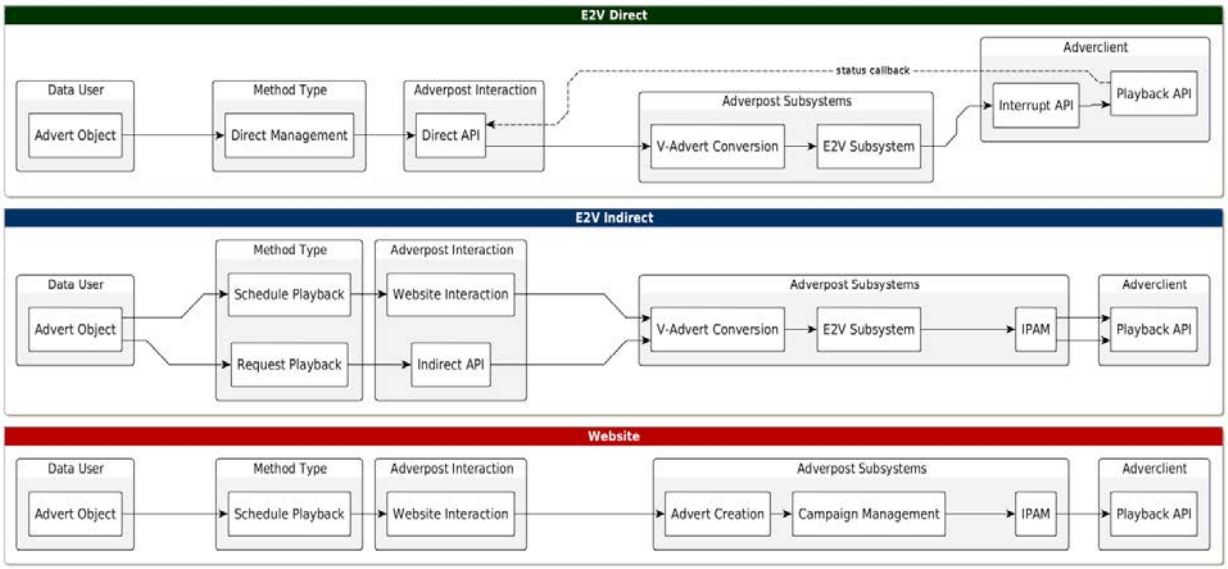
- Bidding for a priority-hierarchy within such a slot.
- Random ordering for idle content playback.
- A sub-subsystem within the slot's actions.
- Other V-Commerce functions

In relation to the Four-Party Model of Adverpost, IPAM serves as a function of the Data Manager in that the DM is the bridge between Data Providers and Data Displays. See diagram below for illustration:



Here we can see how IPAM serves to collate information and/or data from Data Providers and Data Displays (which are in turn collating data from Data Users). The Data Manager *actively* links together information from the DP to the DD which is *passively* collected and updated unless an E2V scenario is in place. In the case of a fully-E2V system, IPAM may be utilised itself as a Data Provider to the E2V system and/or IPAM may be bypassed entirely (DP to DD through automatic mechanisms).

Here is a process diagram of possible E2V management scenarios with IPAM:



As you may note, except for a *direct* transmission/control method for a Data Display; the IPAM subsystem is directly used for managing sources from a Data Provider.

Dealcode Adverpost and API

Introduction

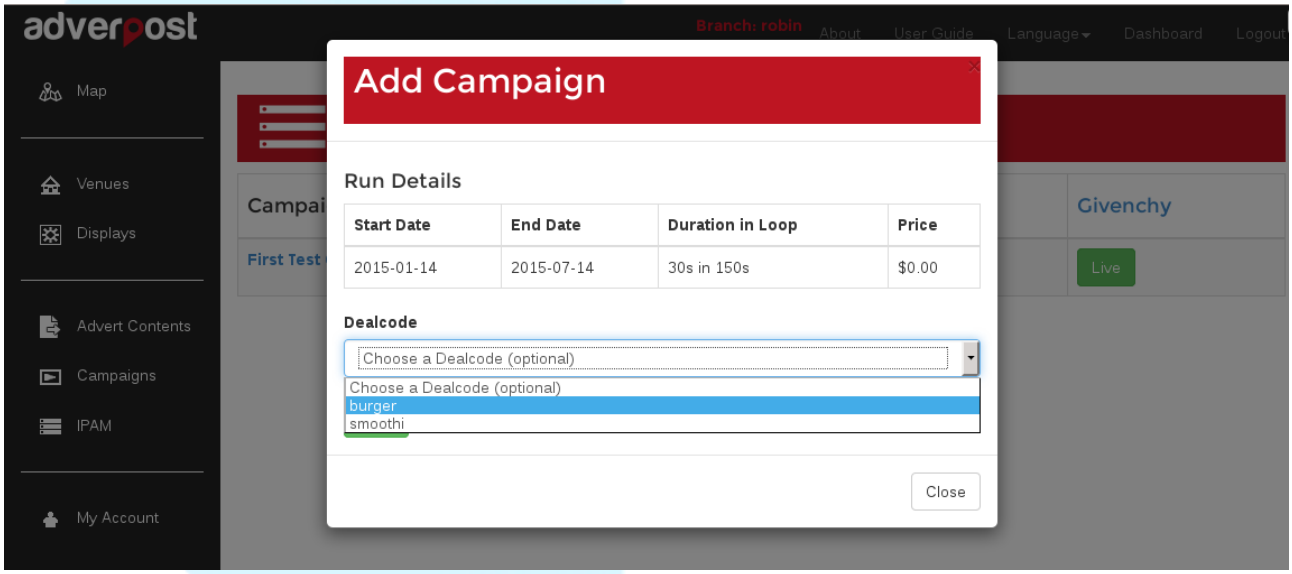
Following is a simplified description of Dealcodes in Adverpost/IPAM Version[5] 1.0 There are two different interactions between Adverpost and Dealcode:

- when an Advertiser uses Adverpost's IPAM interface, a request is sent to the Dealcode server to request all current Dealcodes, so that one can be included in the scheduling of an advert,
- and, when a Deal has been modified, if it is changed so that it has no stock left, or has been deleted, the Dealcode server sends an update to Adverpost to hide it from scheduled adverts.

The API for these communications are outlined in this document.

An Advertiser uses Adverpost's IPAM interface

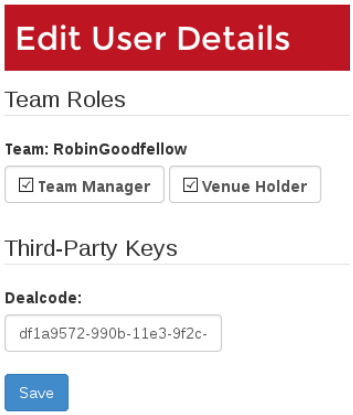
When an Advertiser is about to add an advert to a display's schedule, a modal is displayed providing information about the advert and the display and also providing the option to add a dealcode to this schedule. This is illustrated in the image below.



The items in the menu have been retrieved from the Dealcode server. As the modal loads, Adverpost sends a request to the Dealcode Server.

The Third-Party-Key is a value stored for each user's team. When a user edits their account, this value can be stored. The Dealcode API-Key can be copied from the Dealcode server by the user and pasted into the field as illustrated below.

[5] Please note the current version of Adverpost/IPAM is 3.2 and there has been significant improvements.



This Third-Party-Key value is sent to the Dealcode Server, which looks up all currently active deals belonging to that API-Key. The found deals are returned to the Adverpost Server as JSON-encoded data, which then converts it to an array for display in a select-menu in this modal's form.

When the deal is added to the scheduled advert, the Dealcode data is saved to the Adverpost database. This data is retrieved when an Adverclient requests its schedule via the API function getSchedule. Data about the Dealcode, stored in Adverpost and then passed to Adverclient, affects how the Dealcode is then displayed in the advert on the display.

A Deal is modified

When a deal has been modified on the Dealcode Server, via any one of the following functions:

- update a deal,
- delete a deal (which marks it as hidden),
- enable a deal (which marks a hidden deal as visible again),
- or, redeem a scan,

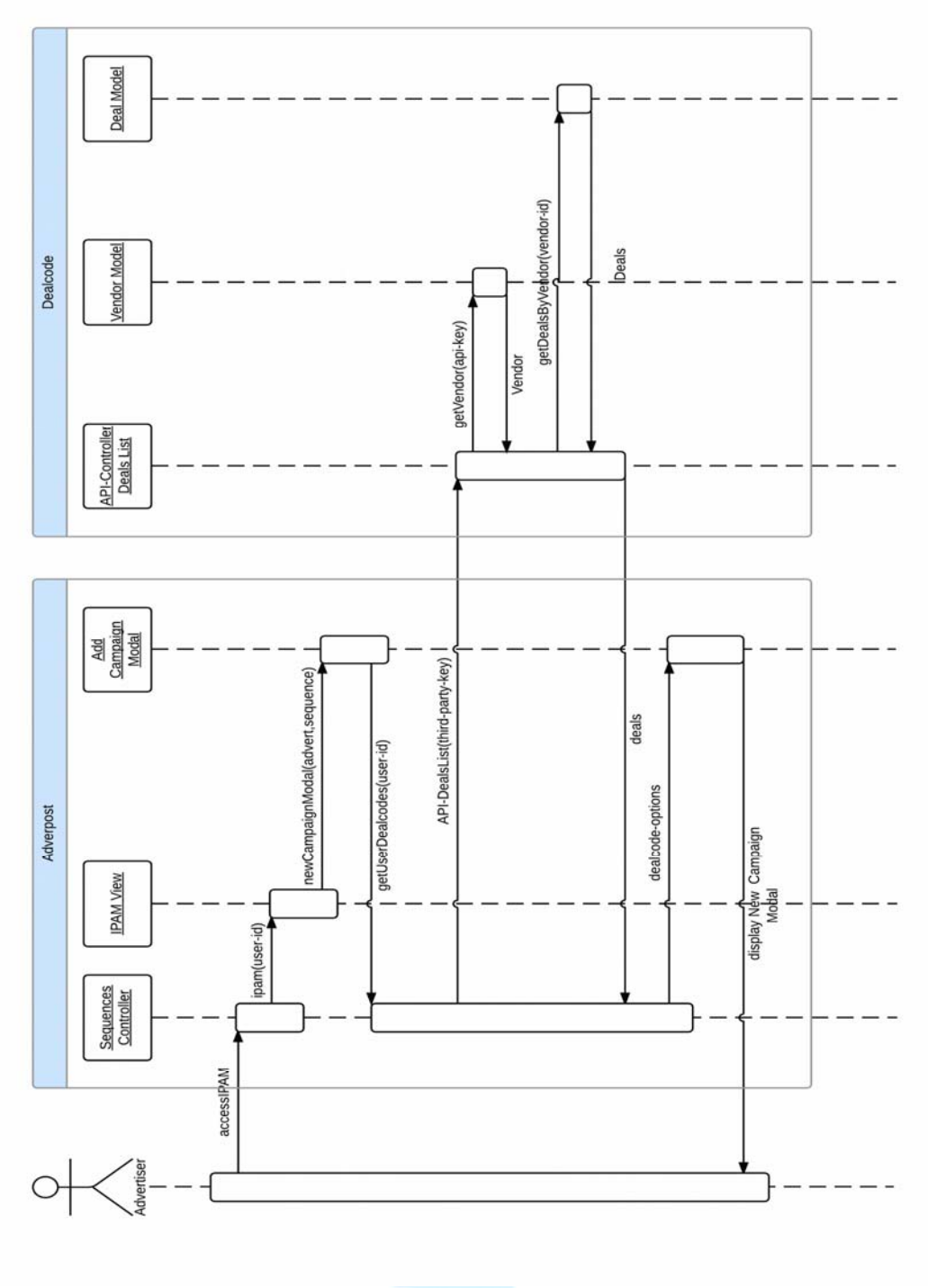
then the Dealcode server updates the deal and checks to see:

- if the stock has been reduced to 0,
- if the stock has been raised from 0,
- if the deal has been hidden,
- or, if the deal has been made visible after having been previously hidden.

At which point, the Dealcode Server sends a JSON-encoded message to Adverpost.

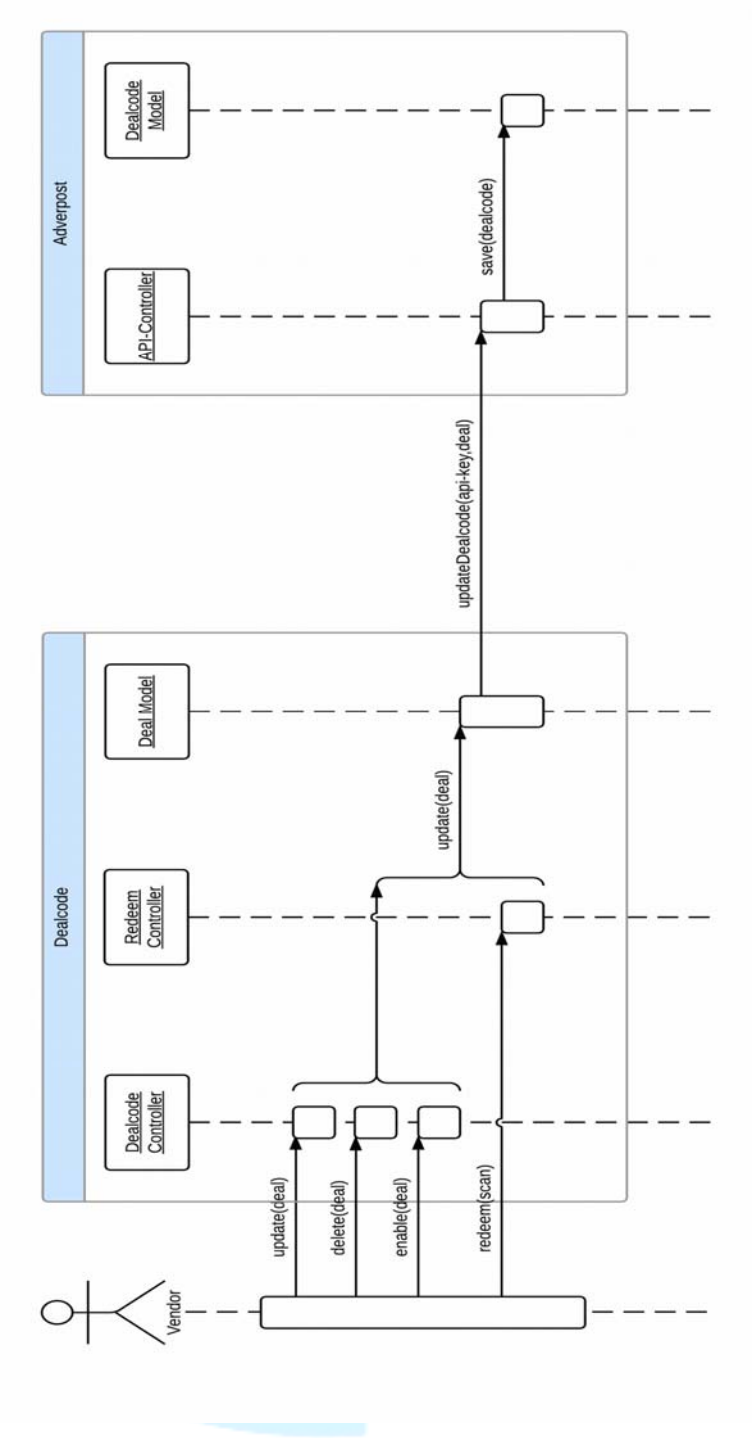
Adverpost receives this data and updates the entry in the database to flag the dealcode to either hide or show it. This updated status will then be received by Adverclient when it next checks its schedule, and the Dealcode will be appropriately hidden from or shown on the advert(s) it is scheduled in.

IPAM-Dealcode Diagram



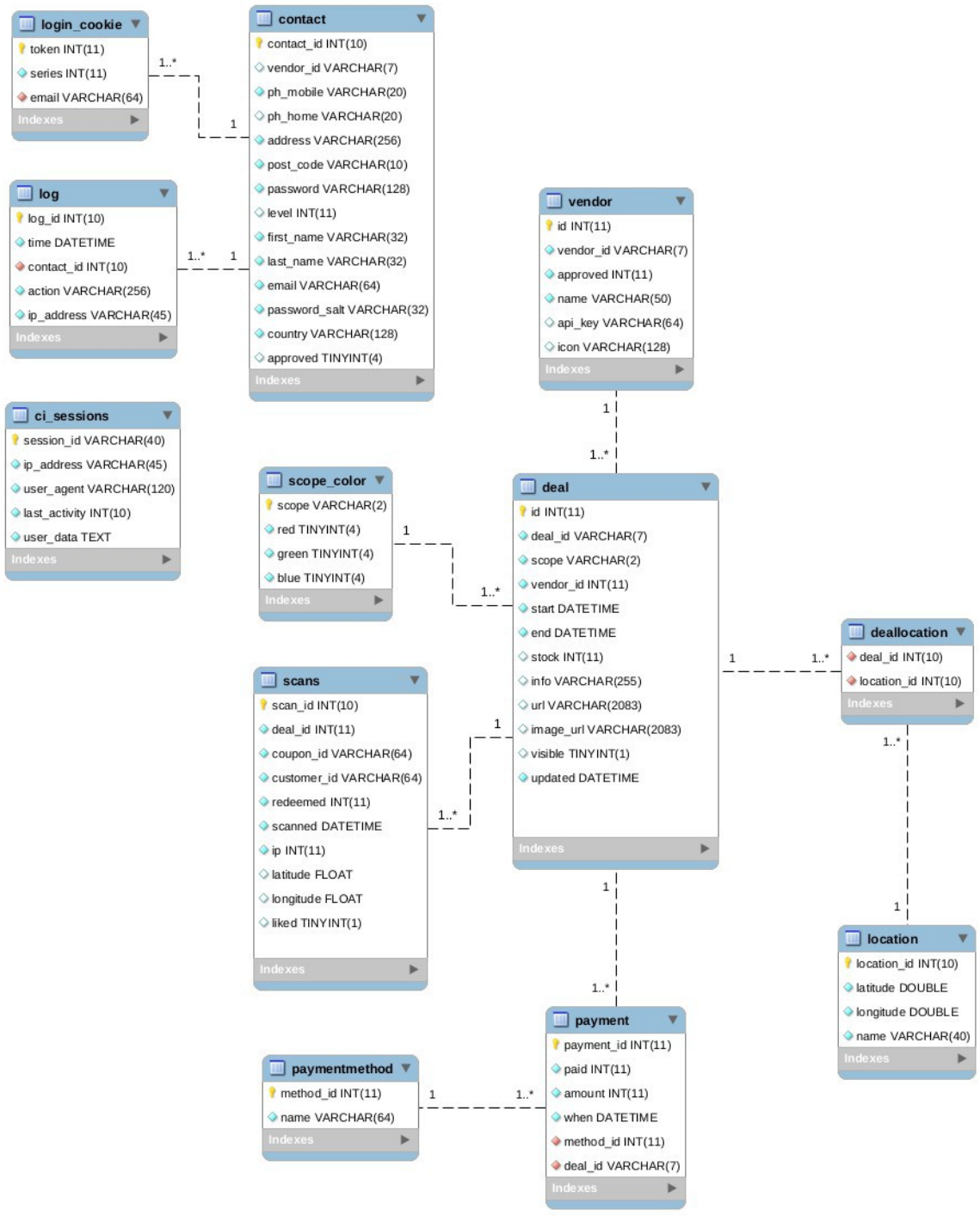
A Functional Block Diagram of Adverpost/IPAM/Dealcodes

Dealcode Modification Diagram



Dealcode Entity Relationship Diagram

Dealcode Entity Relationship Block Diagram



A Simplified Block Diagram of Adverpost/IPAM/Dealcodes Data Realtionships

Dealcode User API

Introduction

There are three primary Use Cases for the Smartphone End-User interacting with Dealcode:

- when the Smartphone End-User Scans a Dealcode to acquire a Coupon,
- when the Smartphone End-User reviews the list of coupons that have been scanned and stored on the smartphone,
- and, when the Smartphone End-User takes the Coupon to a point-of-sale for the Deal in order to redeem it for the desired reward.

Scanning a Dealcode

A Smartphone End-User uses a smartphone to scan a dealcode which is on a display. The phone app reads the Dealcode image, then connects to the Dealcode server, which identifies the Deal from the Code, then retrieves the data about that deal and sends it to the End-User's smartphone. When this is performed, the scan details for this coupon are registered on the Dealcode server, for later retrieval when redeeming the coupon.

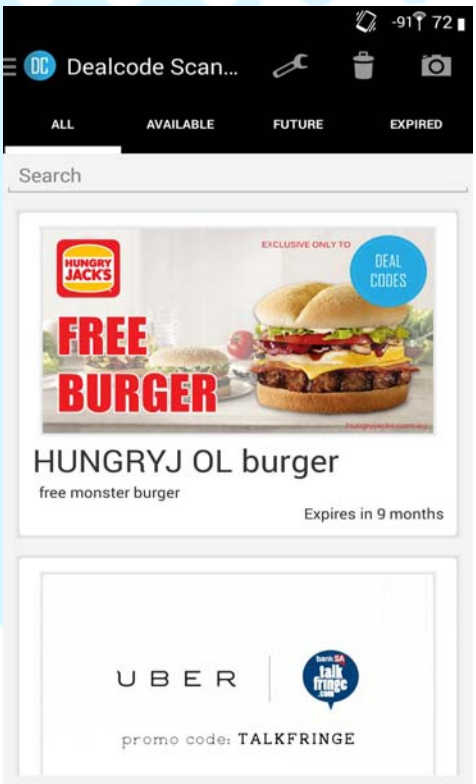
Dealcode APP Scanning the Dealcode from Advert

The sequence of events is:

1. the Smartphone End-User points a phone at a billboard showing a Dealcode,
2. the app reads in the Dealcode,
3. the app connects to the Dealcode server, sending the barcode data,
4. the Dealcode server receives the barcode data and looks for the Deal on the database,
5. when the Deal is found, a coupon is saved to the server's database, and
6. a copy of the Coupon is returned to the smartphone,
7. the smartphone receives the Coupon as a response to the sending of the barcode data,
8. it saves the Coupon to the phone's internal database, and
9. displays a confirmation message to the Smartphone End-User.

Reviewing Scanned Dealcodes

The Smartphone End-User uses the smartphone app to review the list of coupons that have been scanned and stored on the smartphone. As the data for the list of Coupons is stored on the smartphone's database, there is no need to contact the Dealcode server for this activity.

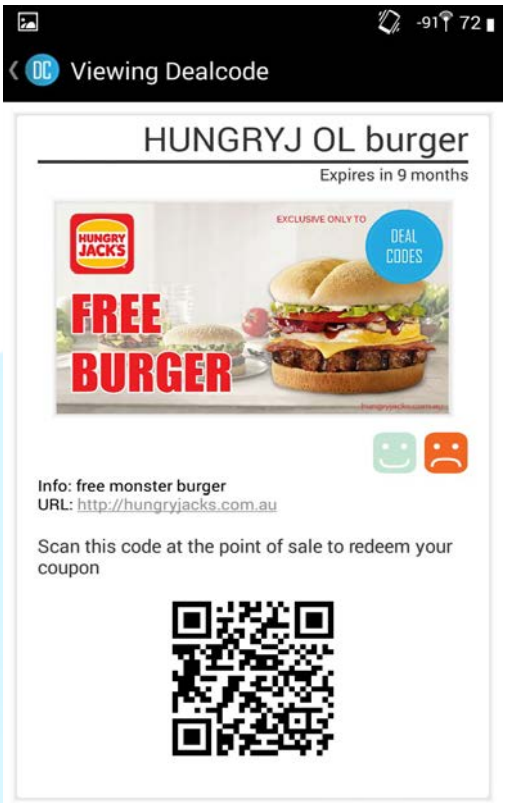


Scanned Deal Codes Viewer

Redeeming a Coupon

The Smartphone End-User takes the Coupon to a point-of-sale for the Deal in order to redeem it for the desired reward. The Vendor scans the Coupon,

resulting in the Deal stock being reduced and the Vendor supplying the End-User with the product/service for the Deal.



Smart Device Dealcode APP

The sequence of events is:

1. the Smartphone End-User goes to a Point-of-Sale and shows the Coupon to the Vendor,
2. the Vendor scans the Coupon,
3. the scanner connects to the Dealcode server, sending the coupon data,
4. the Dealcode server receives the coupon data and looks for the Coupon on the database,
5. when the Coupon is found, it is marked as redeemed, and
6. the Deal for the Coupon has its stock reduced by one, then
7. the Dealcode server returns a confirmation to the Vendor's scanner,
8. the scanner receives the confirmation as a response to the sending of the coupon data,
9. and, the Vendor provides the End-User with the product/service for the Deal.

The Adverpost/IPAM with Dealcodes represents a quantum leap advance over prior art. A brief comparison is provided in the following section.

Prior Art Digital Advertising and V-Commerce Model Inventions

Following is a brief explanation of the multiparty and the prior arts two-party models.

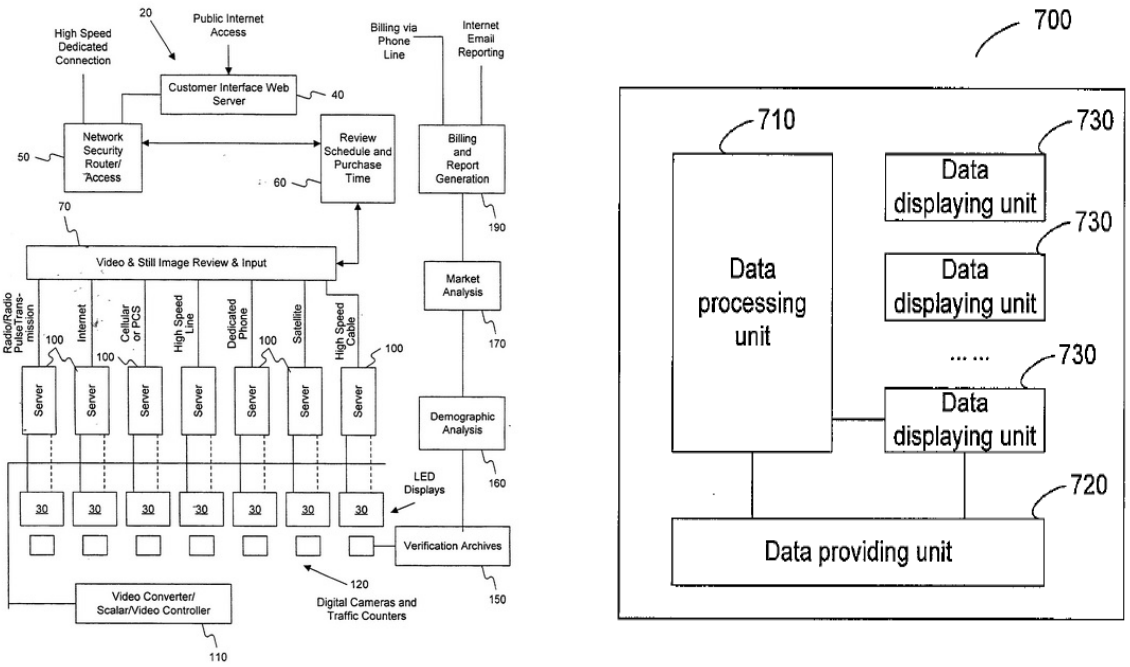


Figure 1 of Hunter (left) versus Figure 7 of One World Technology (right)

Hunter in US6430603 B2 teaches:

1. Customer communicates with Customer Interface Server (40) and/or communicates with Network Security (50) and through it with Review Schedule and Purchase Time (60) only. This assumes the whole world speaks English and have the same code/internet server which is not true.
2. "The system of the invention includes a central information processing center that permits customers to review a schedule of times and electronic display locations that are available for placement of advertisements, and also permits customers to purchase available times at selected electronic display locations for placement of their advertising content.
3. The customer then transmits his video or still image advertising content to the processing center where the content is reviewed for appropriateness and then transmitted to the customer-selected electronic display(s)
4. No connection or relevance is established between "Verification Archives" and the "Customer Interface Server"
5. The architecture of LED displays are not as shown in "Server (100)" but are patented inventions in U.S. and China and interfacing them to Server is one of Synchronous, Asynchronous or Dual which dictate the design of "Server" and Interfaces to display and the media providers.
6. Review Schedule & Purchase Time (60) drives the Hunter's "Video Converter/Scalar Video Controller" (110).
7. Hunter requires Cameras (120) and Verification Archives (150) to record and verify that LED Displays are working (because there is no provision for LED Displays (30) to communicate back as they are receive only devices through Scalar/Converter).

One World Technology:

1. Data Providers (advertisers) have direct communication links with Data Displaying Unit (Display System) and Data Processing system directly. This allows different countries (different code and languages handle their market differently). Also the overhead of communication and processing (detail work) is handled by these parties while "Data Processing Unit" manages the process and controls the selection Geo-location map.
2. The Data Processing Unit allows Data Providing Unit view maps (which were invented in 2005 after Hunter disclosure) to target markets. Data Processing Units collects data from (unlike Hunter's) the Displaying Units.
3. The customer then transmits his video or still image advertising content to Data Displaying Unit (or IPAM disclosed in separate filing).
4. Data Displaying Units communicate status to Data Processing Unit directly and no separate central verification system is needed.
5. The architecture of Data Displaying Units are patented inventions in U.S. and China and interface through one of Synchronous, Asynchronous or Dual control unit modes and can communicate to authorize users through Data Displaying Unit or Data Processing Unit.
6. Displaying Units schedules are not driven by Video & Still Image Review & Input (70) centrally. Each displaying unit obviously is equipped with Synch/Asynch and or Dual control system locally.
7. Displaying Units communicate with Data Providing Units and Data Processing Units (they are not receive only billboards like Hunters).
8. Other related inventions such as deal codes eliminate the need for separate surveillance and counting/statistics systems and can add transaction processing capabilities to screens with users smart devices not anticipated by prior art.

In Summary

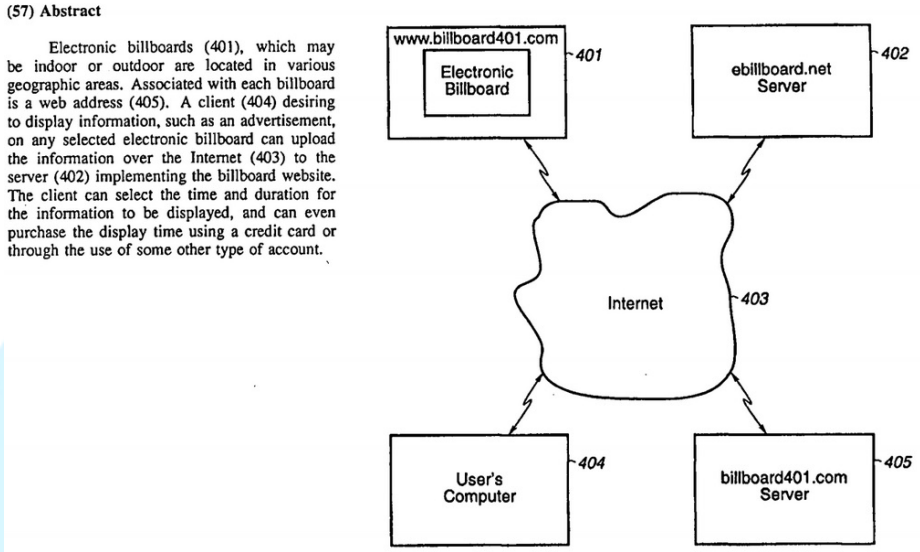
Hunter discloses an advertising solution that users advertisements are sent to LED displays in unidirectional two-party environment while OWL discloses display subsystem of a transaction processing solution that is bidirectional and multiparty.

1. First internet global map goes live February 2005. For more details click on the link below. (http://www.google.com.au/about/company/history/) This is long after Hunter application filing which explains the limitation of "Schedule of" rather than actual display locations.
2. Adverpost/IPAM are now delivered products and solutions not abstract ideas
3. Live communication and status feedback between displays and Data Processor ensures the actual presence and operation of Display. A schedule or list of displays and their purported locations cannot.
4. The direct posting of advertisement to displays is in real-time and automated. Hunters requires verification and system downloading to displays. The delays and downloading requires too many resources and causes delays and batch operations – while OWL solution is direct and resources for uploading is provided by Data provider and not "Video Still Image Review & Input" (70)
5. Current Invention eliminates the need for "Video Converter/Scalar Video Controller" (110).
6. Review Schedule & Purchase Time (60) drives the Hunter's "Video Converter/Scalar Video Controller" (110) while the Schedule of OWL is determined by the Venue and Display Driver.

It is important to note the two-party "**SYSTEM AND METHOD FOR SELLING ADVERTISING SPACE ON ELECTRONIC BILLBOARDS OVER THE INTERNET**" invention was registered internationally by S1 Diamond Technology, Inc. as US0008742 (or CA 2355212 C) which defines a two-party model.

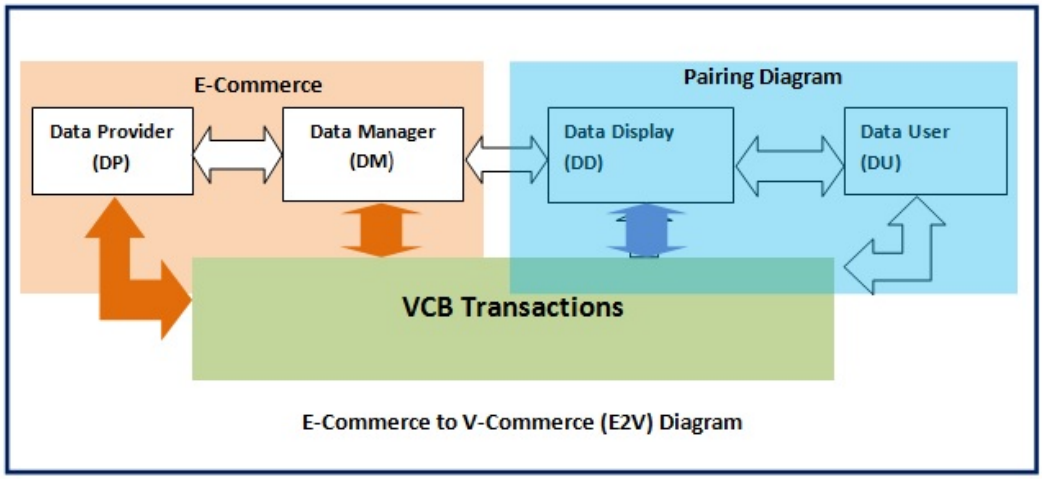
Note that the referenced Patent (PCT/US00/08742) is a two party solution where the Advertiser has to know the internet URL (address) of the billboard (assigned to its driver server on internet) as his target website in order to place an advert on one digital billboard presented as a website.

In this model the advertiser uses a computer with internet service to access the only host on internet that drives that target display for placing his/her advertising.
Only one website for one billboard directly accessible by an internet user 404. See below.



WO 00 655518 A1 PCT Fig. 1, PCT by Si Diamond Technology in 2000

In contrast our invention uses a 4 party model (Data Provider DP, Data Manager DM, Data Display DD and Data User DU) which I am not sure exactly how it is described in this application. Where Data Provider (advertiser) submits the advertising to Data Manager for one or more Data Display parties that he has selected from geo map for advertising. Our invention is very different than a one website per display that the user must know to communicate with. See block multiparty diagram below.

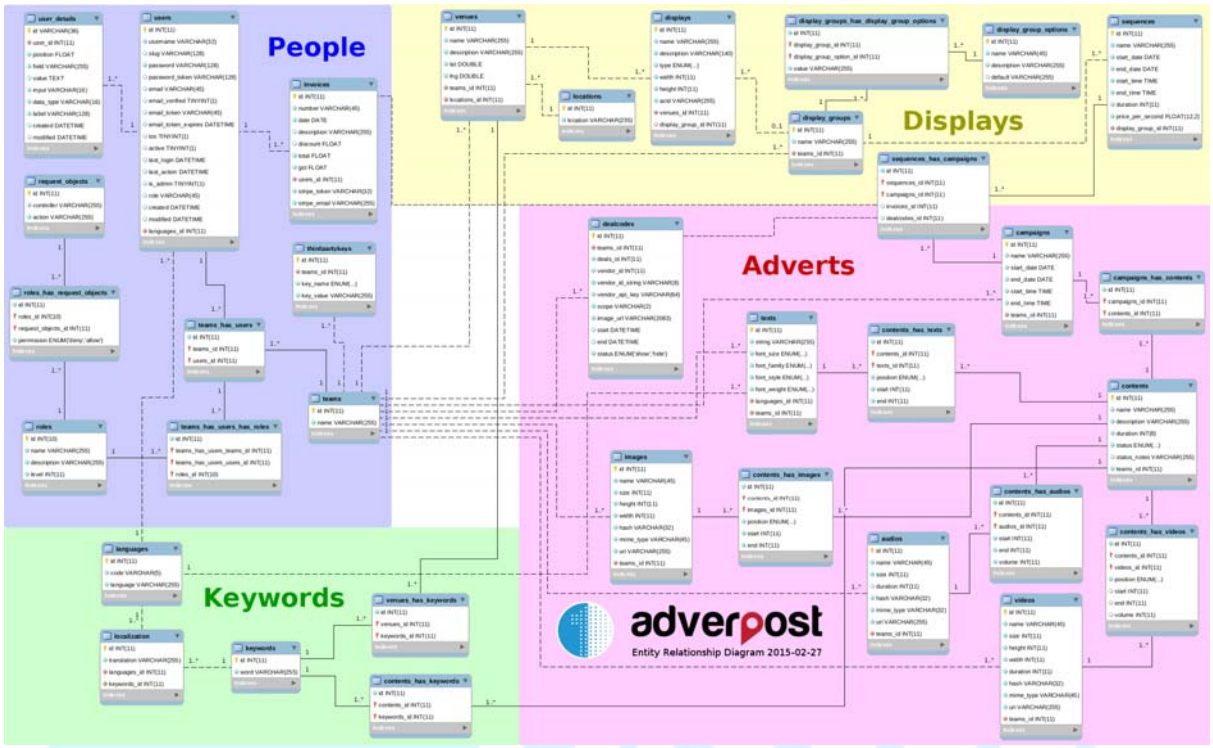


Block Diagram of the Multiparty V-Commerce Model

Note that in PCT/US00/08742 prior art the 401 is connected to website (405) which resides on server 402 on the internet - in effect www.billboard401.com is the URL of the internet server billboard401.com which resides on 402 ISP and not three separate servers on the web. See abstract

below which explains 401 has a web address 405 for server 402 implementing billboard website. These limitations has encouraged replacement of this model with the multi-party model of One World Technology shown above.

The block diagram of data elements for one embodiment of this new model is shown below.



Adverpost/IPAM with Dealcodes block diagram

As it is clearly shown above the prior art model for distributing advertising does not contemplate the transaction processing and only partially addresses the one way delivery of the adverts to the Screens as receive-only devices. The state-of-the-art One World Technology inventions addresses v-commerce needs which incorporates advertising and information/coupon distribution and market interactions as well as many other exciting possibilities.

One World and Elite Marketing have integrated **all the above** explained solution technologies and has provided additional tools-explained in another paper in detail-that will allow any small to medium size company to establish themselves, advertise and find clients for their products and services globally, selling their products and services directly to clients with or without agents, distributors and resellers at a reasonable cost. These tools and system is V-Commerce.

In effect Virtual Commerce is an electronic platform that makes virtually any and all transactions possible. Currently, transactions are performed in non-electronic (physical or real transactions in multi-party) or semi-electronic (email, e-commerce, phone, fax, etc. in two-party transactions with physical fulfilment by third parties). Virtual commerce will close the loop and allow multi-party transactions through a series of inventions that solve and address current problems and shortcomings that have prevented this advance so far.

V-Commerce allows establishment of Virtual Shops on Virtual Malls using outdoor platforms of digital displays globally. The users and clients use their smart devices to directly accept offers, order, trade, purchase and conduct all other possible transactions in a true multi-party setting, using any

currency or method of payment with their target Virtual Shop (in a Virtual Mall or stand-alone Virtual Shop) and ship or accept delivery anywhere in the world.

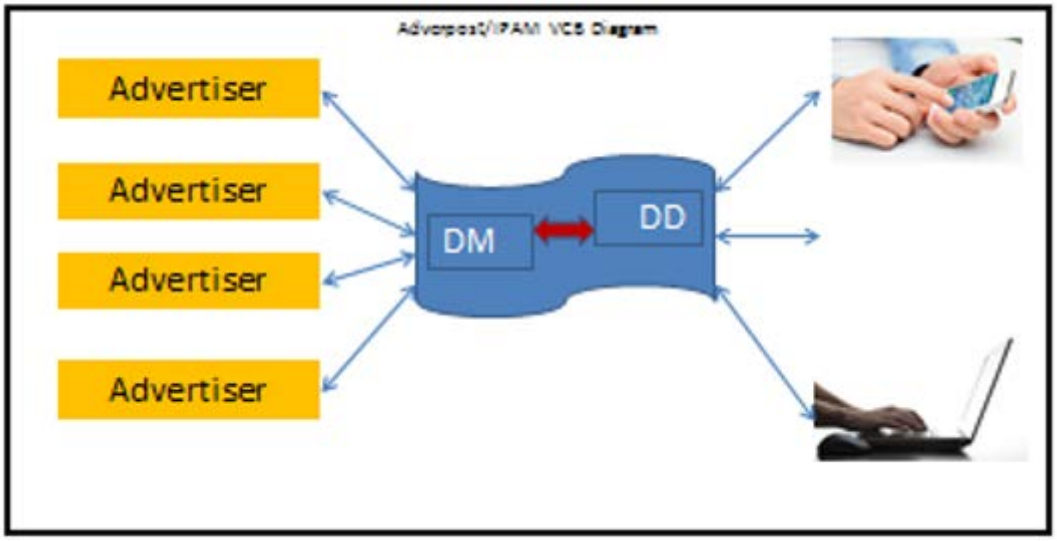
V-Commerce Platform Essentials

The V-Commerce requires a multi-function platform. These stages include;

1. Global advertising platform to offer the products anywhere in the world – in Virtual Shops and Virtual Mall displays in real-time. This is Adverpost.
2. Global Purchasing ability by users anywhere in the world to inspect, clip coupon and or transact with the dealers or providers directly. This is smart device V-Shop.
    a. For transaction payment to be processed automatically and paying all the parties in the transaction along the way as necessary. This is smart device VOP (Virtual Offer Protocol or Processor) application.
    b. For coupons to be saved in a Coupon wallet for future use
    c. Loyalty credits, volume discounts and other features of transactions
3. For the dealer/provider to update offer and or service in real-time (change price, quantity and availability). This is IPAM/Adverpost Client.
4. For Virtual Mall and Virtual Shop owners to offer their "virtual real estate" to the highest bidder to offer their products and services in a global setting. This is Adverpost.

The inventions that provide for development of V-Commerce platform include;

1. Flash Module Array Systems and related inventions
2. Adverpost/IPAM and related Inventions
3. VCB and Deal-Code and related inventions
4. Softpanel and related inventions – V-Shopping
5. E2V Ecommerce to V-commerce Bridge



Multiparty Model of Adverpost/IPAM with Data Provider (Advertiser)

Appendix 1 - LED Hardware Issues and Recommendations

LED Issue or Fault	Possible Reason(s)	Resolution
Part of an LED module is off or led lights not lighting	A) Disconnected power B) Bad driver ICs or contacts to PCB module	1) Check Power supply and contacts 2) Check Data cable leads
An entire LED module is off or few modules in a row are off	A) Disconnected power or lead to the first module in a cascade B) Bad Power Supply or connection C) Bad or missing Data Cables	1) Check the power cable leads and contacts and reseat, crimp or reconnect. 2) Reconnect to the leads of Power supply or replace P.S. 3) Reconnect or replace data cables
Entire Screen is off but the receiving card green light blinks or does not blink	A) Cat5 cable(s) disconnected on Receiving card or cabinet B) Problem with input or output of previous cabinet in the cascade link C) No power to receiving card D) Receiving card or sending card is faulty or damaged	1) Reconnect or reseat the cat 5 cables and the RJ45 connectors 2) Check the Input and Output ports and connections 3) Restore 5V to Flash Module Controller card (receiving card) 4) Call for Service if problem persists
All or some cabinets play off-line (Asynch) contents in Synch mode		
No video on LED display and the green light of sending card does not blink or flash	A) DVI input is disconnected B) The display is not correctly set-up C) Sending card[6] is faulty or intermittent	1) Reconnect or replace the DVI cable or connections. 2) Restore set-up or set-up again. 3) Call for Service if not resolved
Section of a cabinet in form of a row of modules is off	A) Data cable disconnected or faulty B) Sending connector of previous module or receiving circuitry of first module in the row is bad C) Bad hub port or connection D) Dirt build up in the circuit	1) Re-seat the data cable or replace the data cable 2) Check the problem by reconnecting to another module or skipping the first off (or out) module. 3) Verify the connection to and the hub 4) Try dry air cleaning and reseating connections

[6] For Linsn type controllers

LED Issue or Fault	Possible Reason(s)	Resolution
A number of pixels are off or missing a colour	A) Data cable is loose or disconnected. B) Sending module port or receiving port on the module is faulty C) The first LED in the row has a cold solder joint or is loose	1) Reseat or reconnect data cables 2) Clean contacts and retry 3) Call for service to replace module
A few Cabinets are off	A) missing power	1) Restore power to cabinets in the power chain.
Picture or video faulty or choppy on the entire display	A) Set up is damaged or incorrect B) Flash Array control or mapping error C) Wireless transmission inadequate or weak	1) Restart operation to reset 2) Verify the data cable and transmission strength 3) Upgrade to stronger transceiver pair or limit the distance to screen
One cabinet is off or plays off-line contents	A) Data not getting to receiving card circuit and mapping unit	1) Reseat and reconnect RJ45 terminal 2) Check the power supplies and cables 2) call for service
LED cannot be found or network port not detected	A) Sending port connections missing B) Serial port not connected[7] (Sending card)[8] C) Bad Sending card D) PC port is damaged or blown	1) Verify operations of the ports and connections 2) reconnect or replace wires 3) Replace Sending card
A few modules stay off or flicker	A) Power source missing, intermittent or damaged B) Power is disconnected	1) Check Power supply and the connections 2) Power supply or cable needs to be replaced or re-connected

[7] For Linsn type controllers

[8]

Appendix 2 - LED Digital Signage Selection Guide

How to Select LED

Following are the key criteria for LED selection;

1. Location – Indoor, Outdoor or Semi-outdoor

Location will determines some of the most important factors for selecting the correct LED. Whether the location supports access to the back of the LED system such as rooftop, large billboards and stage backdrops or requires front access for servicing the LED system different type of cabinets and modules will be required. Additionally, if the final location of the LED demands viewing through the LED screens such as facing of the high-rise buildings and structures with occupants needing natural lighting or viewing through the LED screen then different Led technologies such as curtain LEDs must be considered. Following details key aspect for LED selection depending on location.

Where you intend to install the signage determines this aspect of selection.

Indoor- for inside the building and indoor environment (and air-conditioned) spaces such as indoor arenas, lobby of hotels, churches or shopping malls the **indoor**-type LED should be selected. The indoor LED must be protected from direct exposure to the harsh weather such as direct sunlight and rain. Controlled temperature will extend the life-expectancy and up-time of the indoor LED systems.

Outdoor- for the locations outdoor and directly exposed to the environment such as stadiums, roadside, billboards, or on the high-rise buildings, the **outdoor**-type LED should be selected.

Semi-outdoor- If the location is protected from exposure to rain, direct sunlight and children's access such as in an enclosed balcony or windowless buildings then the **semi-outdoor**-type should be selected.

Also review the **Duty-Cycle** factor as it is another key factor in selecting the correct product that meets your application requirements. If the natural light and viewing through the LED screen is required then Curtain LEDs must be specified for the indoor, outdoor or semi-outdoor. These factors make significant difference in cost per square meter of the final product being specified.

2. Size, Shape & Pitch -

These parameters are inter-dependent and determined by the location, power and the view-range.

Size - Once you have measured the height, width and depth of the space and

availability and type of the power (110, 220 and 30, 50 or 100 Amp, etc.) then you want to make sure the selected LED size (and number of cabinets, height, width & depth) can be accommodated. Then select the LED size that supports the viewing range where the audience traffic will take place. For example for a typical shopping mall an indoor, 2M X 4M may provide the best effect while for fashion displays a P6 indoor display 3M H X 1.5M W on a 50CM platform may provide the best size.

Shape – determines if nay curvature or flat panels are required.

Pitch – The pitch determines the contents of the display and the range of viewing. The longer the viewing range the larger the pitch should be as it also determines the lighting capacity and visibility. For example, for outdoor signage to be mounted on the high-rise buildings for visibility in the skylines, pitches 20 or higher must be considered and for indoor applications usually the P8 or less should be considered. Whereas for small and narrow high foot-traffic streets and malls P6 to P8 provides the best viewing experience where heights of 2 meter or higher and widths of 4 meter or more can be supported.

3. Mode of Operation

The application of the LED display System will determine the features and functionality requirements of the LED display system. The design features of the Flash Module Array System determine the features and operational capabilities of the LED screen. There are three modes of operations Synchronous, Asynchronous and Both (Dual). These modes were briefly described in the communications options section of this Handbook. A summary description of these operation modes follows.

- **Synchronous** – This means that LED screen operating features and operations are controlled by the host system or server that is connected to it. The software utilities that set up and control the LED display operate under the operating system and services of this host system or server that is connected to the LED. This connection may be one of the various communication means that are supported by the host and interfacing with the LED Flash Module Array System using any method such as Cat-5, Wireless, 3G or Wi-Fi. These host based software utilities include Adverpost, LEDSHOW, LEDSTUDIO, LEDVision or MCLED. Most high-end and full-featured LED systems support Synchronous mode.

- **Asynchronous** – LEDs equipped with this type of control systems are used for limited functions of messaging or advertising. These LED systems communicate with a host to receive the contents, schedules and operating features which they store in their controller and operate as directed without the need or support of the computer. This limits the capabilities of these system to coordinate or synch its information in real-time using a host computer or server. These LED systems are deployed in cheap temporary traffic control systems, digital photo albums or fixed message informational or advertising displays.

- **Dual Synch/Asynchronous** Operation Modes – These systems deploy more sophisticated control systems that work in conjunction with a host, server and or network. These LED systems can be programmed as needed to switch to off-line or asynchronous mode in case of a system or network failure.

The mode of operation not only determines the features and capabilities but also expansion and upgrade capacity of the system as well. Limited function LED displays incorporate Asynchronous control systems while full function, networked LED systems, billboards and in future virtual displays incorporate Flash Module Array Receiver cards supporting dual synchronous and asynchronous modes such as scoreboards with advertising and real-time TV tuners to broadcast concurrently from multiple sources of information.

4. Colour

This parameter is determined by the application. If you only need to provide instructions or identifying labels such as store name, entrance, exit, or directions, then single colour is sufficient and most cost-effective solution.

However, for all other applications **full colour** must be considered as the cost difference between dual and full colour is basically insignificant as most of the cost is due to the other parts and addition of one of more colour and the versatility offered provide the best payback for the investment, especially, where the size exceeds 2 square meters.

5. Sound

This is application-dependent and for fashion display, entertainment and news type environments the sound is a necessary part of enriched experience, especially for indoor installations.

6. LED Facing Direction

Outdoor LEDs facing east or direct west sunlight will require higher lamination than those facing north or south. The larger outdoor billboards and configurations must be equipped with automatic light sensors to automatically adjust brightness in reaction to sunlight and cloud covers.

7. Viewing Distance and Angles

The optimum viewing range is typically 5-20 times the diagonal width of the LED screen. Following diagram helps in using the range to calculate the optimum

diagonal width of the LED. The diagonal width is square root of the sum of the squared height and squared width (D = SQRT (W**2 + H**2).

Each LED panel and the resulting display system that is constructed from it is bound by the viewing angle for which it is designed. Most LED's are designed to present the best possible picture in the widest possible angle. However, it is up to the user to determine that the viewing angle design limitation meets the location and intended target traffic requirements. Most One World LED systems are designed to provide a 160 degree or better viewing angle.

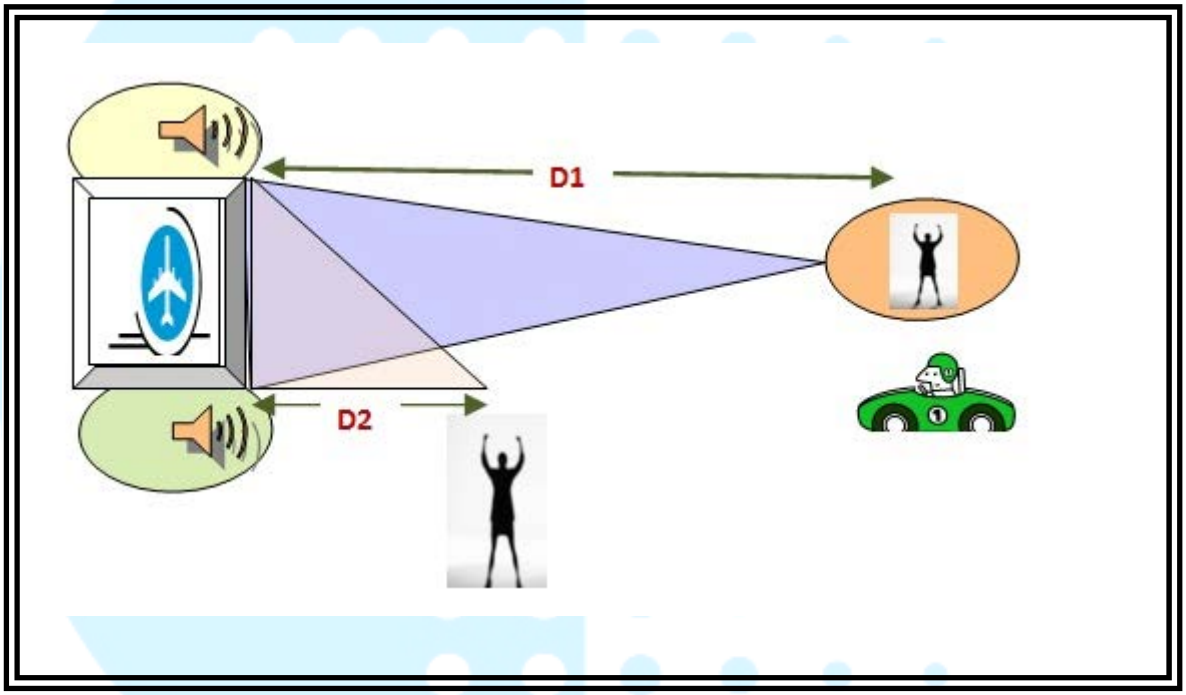


Diagram shows the viewing range from a minimum view (D2) of 10 degrees to a maximum view (D1) of 160 degrees. Angle of view, in reality is in both direction with intersect line perpendicular to the centreline of the screen.

7. Duty-Cycle

Duty-Cycle refers the frequency of utilisation. For example the stadium LED score-boards that are used only a few hours a week can have a significantly different utilisation rate than 24-7 road-side bill-boards. This results in quicker aging and life-cycle use of the components and modules resulting in a failure coinciding with the weakest or shortest-life component of the system. For this reason it is critically important to select the right product rather than the lowest bid price. Over the life-cycle of the product the lowest ownership cost will be reward of correct product

selection at the front-end of the project.

The factors that drive the duty-cycle are MTBF, Lifespan and environmental specifications of not only the modules and lamps but also all the subsystems including: power supplies, communication devices, sending and receiving cards, the computer or media-payer and the remote service provider. There have been too many horror stories regarding multi-million dollar installations and projects that have been comprised over a few hundred dollar savings in selection of systems.

The correct duty-cycle or quality product will result in significant savings from repairs and return on investment by additional uptime.

8. Network Configurations

The application may require the target LED display system to participate in a local, wide-area or a global network with or without other display systems.

9. Service Access

The application may require the target LED display system to be flush-mounted on a wall indoors or outdoors. This will pose a problem for service access to the internal parts as facing of the LED screen may be filled with pixels and not allow easy opening access to get to the internal cabinet parts.

If the front-open cabinets are specified, the entire front of vertical sections must be opened to access internal parts including, controller cards, modules, wiring and power supplies. As a result front-open (AKA front-serviced) cabinets cannot be stacked (prohibits opening of the front of the cabinets). This limits the height of the front serviced cabinets to a maximum of 1920mm and increases the cabinet cost. See cabinet design considerations for more details.

Please refer to One World LED Design Primer and One World LED Architecture Primer documents for in depth discussion of design and architectural factors that may need special considerations for your projects.

Appendix 3 - ADVERPOST Contents Management and Advertising

Appendix 4 - Other Digital Signage CMS Products

FREESTUDIO	The Freestudios Digital Signage solution is a web interface you can use through any type of browser without specific IT knowledge. This solution is focused for marketing and communication teams. It features facilities to upload content (slides, pictures and films). Organize the content with a simple to use playlist module and publish the content directly on any screen in your system.
GATEMEDIA	GateMedia offers "The ultimate 3G compatible web based CMS, allowing simultaneous display and administration of independent custom designed screen zones."
MORPHEAD	Morphean proposes a range of products which is dedicated to the Digital signage world. **MORPHEAN DS CMS** is a content management Software. It will respond to the needs of Digital Signage projects. It also helps you to unify different sources of information and to display them on different type of support. Our mobile applications for **Android** and **iPad** complete the classic LCD signage-project.
STINOVA	Stinova's Content Management Software for SpinetiX HMP100/HMP200 is offering the Digital Media Server Solution in its 5th Generation DMS5. It is available as a Windows installer, a virtualized Server image or as a SaaS offering. All solutions are browser based CMS systems including an intuitive content Composer as a WYSIWYG editor and additional support for HMP projects. The DMS5 software supports WYSIWYG compilation of text, RSS Feeds, images, videos and multicast streaming formats.
TECHNILOGICA	Tecnilogica is a Digital Signage consultancy able to cater to the needs of any DS project. Tecnilogica have developed Poster Digital, an integrated, affordable and easy to use digital signage solution.
VISIX	Announce digital signage content management software uses themes made up of matching animated layout and message backgrounds. This lets you coordinate the overall presentation on the screen for digital signage. You select the theme, create fill-in-the-blank and auto-generating templates that match that theme, and assign user access for content contributors. Users then log on, fill in the templates and schedule them for approval.

Appendix 5 – Patents and IP

Sample of One World LED Visualisation and Virtualization Patents

Various One World Technology patents are filed in China, U.S., EU and Australia either directly or through PCT.

One World Technology inventions cover the areas of hardware, software, firmware, technology, utilization and application of LED in commerce.

These invention in particular advance, 1) the Flash Module Array Systems that create the foundation of many future integrated technologies such as data storage, data transportation and data manipulation, 2) Virtual Shopping and e-commerce, 3) Global Marketing, advertising and retailing, 4) Alternatives to traditional commercial real estate malls and big-box retailers, 5) Virtual mall and point of demand virtual storefronts, 6) Advancing the dual-party e-commerce (such as Ebay and Amazon) to Multi-party V-commerce, 7) Secure internet shopping and commerce, 8) elimination of big banks and financial institutions (credit card companies and Paypal) as transaction payment processing and clearing houses, 9) ISO-OSI Level 7 and other standards compatible transactions and finally, 10) The advancement of Smart Device Apps for virtual commerce to list a few.

Following is a sample of One World filed and issued Patent.

[redacted]World Tech Patents

年份 Year	专利名称 Patent Name	专利申请号 File Number	发明人 Inventor	专利申请日 Filing Date	公开日 Date of publication	授权日 Issue Date	专利号 Patent Number
2007	[redacted] OS-Transparent Super OS Communication with Agent Method.	200710132636.1	Schumann Rafizadeh, Hu Ying	2007,年 9 月 日 Sept 29, 2007	2008 年 2 月 日 Feb 27, 2008	2009 年 3 月 日 Mar 11，2009	ZL200710132636.1
	从移动存储设备启动多操作系统的组合装置及其方法 A method and combo device of booting multi-OSes from mobile storage device	200710135056.8	Schumann Rafizadeh, Thomas Arjmandi, Lin Yiji, Cyrus Rafizadeh, Hu Ying	2007 年 11 月日 Nov 7, 2007	2008 年 3 月 日 Mar 26, 2008		Abandoned 未授权
	一种数据块的磨损处理方法和装置 A method and device of block wearout avoidence	200710171786.3	Schumann Rafizadeh, Paul Willmann, Lin Yiji, Hu Ying	2007 年 12 月日 Dec 5, 2007	2008 年 5 月 日 May 14, 2008	2010 年 2 月 日 Feb 24, 2010	ZL200710171786.3
	[redacted] A flash array device (invention)	200710171787.8	Schumann Rafizadeh, Paul Willmann, Lin Yiji, Hu Ying	2007 年 12 月日 Dec 5, 2007	2008 年 5 月 日 May 14, 2008	2010 年 7 月 日 Jul 28, 2010	ZL200710171787.8
	[redacted] A flash array device (Utility Model)	200720198886.0	Schumann Rafizadeh, Paul Willmann, Lin Yiji, Hu Ying	2007 年 12 月日 Dec 5, 2007	2008 年 10 月 日 Oct 29, 2008	2008 年 10 月 日 Oct 29, 2008	ZL 2007 2 0198886.0 Abandoned 已放弃

年份 Year	专利名称 Patent Name	专利申请号 File Number	发明人 Inventor	专利申请日 Filing Date	公开日 Date of publication	授权日 Issue Date	专利号 Patent Number
2008	[redacted] Restrictive Partition Method of Flash Array Device	200810037133.0	Schumann Rafizadeh, Lin Yiji, Hu Ying	2008 年 5 月日 May 8, 2008	2008 年 10 月日 Oct 1, 2008	2011 年 4 月 日 Apr. 13, 2011	ZL200810037133.0
	[redacted] A firmware based virtualization platform	200810200121.5	Schumann Rafizadeh, Paul Willman, Lin Yiji, Hu Ying	2008 年 9 月日 Sept 9, 2008	2009 年 2 月 日 Feb 29, 2009	2012 年 4 月 日 April 18, 2012	ZL200810200121.5
	[redacted]系统切换方法 A switch method based on EFI	200810204083.0	Hu Ying Ke Ruo Shi	2008 年 12 月日 Dec 5, 2008	2009 年 4 月 日 Apr 29,2009	2013 年 1 月 日 Jan 23, 2013	ZL200810204083.0
2009	[redacted] A method and device of EFI based cross platform and cross CPU	200910197256.5	Schumann Rafizadeh, Lin Yiji, Hu Ying	2009 年 10 月 日 Oct 16, 2009	2010 年 3 月 日 Mar. 17, 2010		
2010	[redacted] A device and method of firmware based operating system independent flash array management	201010149051.2	Schumann Rafizadeh, Hu Ying, Lin Yiji	2010 年 4 月 日 Apr.16, 2010			
	[redacted] Flash cluster device and configuration method	201010234704.7	Schumann Rafizadeh, Hu Ying, Lin Yiji	2010 年 7 月 日 Jul.23, 2010		2013 年 7 月 日 Jul 10, 2013	ZL201010234704.7
	[redacted] Flash cluster device（Utility model patent）	201020268635.7	Schumann Rafizadeh, Hu Ying, Lin Yiji	2010 年 7 月 日 Jul.23, 2010		2011 年 4 月 日 Apr 20，2011	ZL 2010 2 0268635.7
	[redacted] Flash array hub, cascading flash array and interleaving cascaded flash array	201010274777.9	Schumann Rafizadeh, Hu Ying, Lin Yiji	2010 年 9 月日 Sept.7, 2010		2013 年 9 月 日 Sept 25, 2013	ZL201010274777.9

年份 Year	专利名称 Patent Name	专利申请号 File Number	发明人 Inventor	专利申请日 Filing Date	公开日 Date of publication	授权日 Issue Date	专利号 Patent Number
	[redacted] Flash array hub, cascading flash array and interleaving cascaded flash array（Utility model patent）	201020519238.2	Schumann Rafizadeh, Hu Ying, Lin Yiji	2010 年 9 月日 Sept.7, 2010		2011 年 4 月日 Apr. 6, 2011	ZL 2010 2 0519238.2 Abandoned 已放弃
	A Device of Flash modules array	US 12/746,719	Schumann Rafizadeh, Paul Willmann, Lin Yiji, Hu Ying	2010 年 7 月 日 July 19, 2010	2010 年 12 月 日 Dec 23, 2010		已答复，审核中 In the process
2011	一种实现数据传输和显示的方法及系统 Method and system for data transmitting and displaying	201110082382.3	Cyrus Shawin Rafizadeh , Schumann Rafizadeh, Hu Ying, Lin Yiji	2011 年 4 月日 Apr 1，2011		2013 年 7 月 日 Jul 10，2013	ZL 201110082382.3
	Method and system for data transmitting and displaying	PCT/CN2011/075731	Cyrus Shawin Rafizadeh, Schumann Rafizadeh, Hu Ying, Lin Yiji	2011 年 6 月 日 June 14,2011			
2012	广告信息显示控制方法和装置 Controlling method and device of advertising display	201210015905.7	Cyrus Shawin Rafizadeh, Schumann Rafizadeh, Lin Yiji, Hu Ying	2012 年 1 月 日 Jan 18, 2012			

年份 Year	专利名称 Patent Name	专利申请号 File Number	发明人 Inventor	专利申请日 Filing Date	公开日 Date of publication	授权日 Issue Date	专利号 Patent Number
2013	**一种实现数据传输和显示的方法及系统** **Method and system for data transmitting and displaying (Adverpost)**	**Australia 220113637**	**Cyrus Shawin Rafizadeh , Schumann Rafizadeh, Hu Ying, Lin Yiji**	**2013 年 7 月 24 日** **Jul.24, 2013**			
		Europe 11862182.0	**Cyrus Shawin Rafizadeh , Schumann Rafizadeh, Hu Ying, Lin Yiji**	**2013 年 8 月 16 日** **Aug 16, 2013**			
	一种数据访问的方法和系统 **Method and system for accessing data (VCB)**	**201310560958.1**	**Schumann Rafizadeh, Cyrus Rafizadeh, Darius Rafizadeh, Lin Yiji, Hu Ying**	**2013 年 11 月 12 日** **Nov 12, 2013**	**2014 年 2 月 26 日** **Feb 26, 2014**		
2014	**一种数据显示设置方式及装置** **Method and device for setting data display (Softpanel)**	**201410025236.0**	**Schumann Rafizadeh, Darius Rafizadeh, Hu Ying, Lin Yiji**	**2014 年 1 月 20 日** **Jan 20, 2014**	**2014 年 4 月 23 日** **April 23,2014**		
	一种数据处理方法、装置及系统 **Method, device and system of data processing (Smart display)**	**201410219695.2**	**Schumann Rafizadeh, Darius Rafizadeh, Cyrus Rafizadeh, Hu Ying, Lin Yiji**	**2014 年 5 月 22 日** **May 22, 2014**	**2014 年 8 月 6日** **Aug 6, 2014**		

年份 Year	专利名称 Patent Name	专利申请号 File Number	发明人 Inventor	专利申请日 Filing Date	公开日 Date of publication	授权日 Issue Date	专利号 Patent Number
2014	**Method and system for accessing data (VCB)**	**PCT/CN2014/090898**	**Schumann Rafizadeh, Cyrus Rafizadeh, Darius Rafizadeh, Lin Yiji, Hu Ying**	**2014 年 11 月 12 日** **Nov 12, 2014**			
2015	**Method and device for setting data display (Softpanel)**	**PCT/CN2015/071005**	**Schumann Rafizadeh, Darius Rafizadeh, Hu Ying, Lin Yiji**	**2015 年 1 月 19 日** **Jan 19, 2015**			
	一种供电控制方法和装置 **Method and device for power supply control （NAPA）**	**201510151935.4**	**Schumann Rafizadeh, Darius Rafizadeh, Yafa, Tom, Lin Yiji**	**2015 年 4 月 1 日** **April 1, 2015**			
	一种展示的方法及装置 **A display method and device (E2V)**	**201510240289.9**	**Schumann Rafizadeh, Tanami Browne, Darius Rafizadeh, Lin Yiji, Cyrus Rafizadeh, Hu Ying, Chen Honghao**	**2015 年 5 月 12 日** **May 12, 2015**			
2015	**Data processing method, device and system (Smart display)**	**PCT/CN2015/079555**	**Schumann Rafizadeh, Darius Rafizadeh, Cyrus Rafizadeh, Hu Ying, Lin Yiji**	**2015 年 5 月 22 日** **May 22, 2015**			

Appendix 6 – LED Setup and Testing Programs

LED Setup Utilities

Please note that this section describes the LED setup and testing software. These packages are not intended for professional networked content management of LED screens. These utilities allow setup, testing and management of one or two smaller LED screens and as a result of provided free of charge to introduce the market to the capabilities of digital Led screens and are sufficient for replacement of static signs with Variable Message Signs (VMS).

These packages cannot list your large LED displays on global internet services for direct advertising purchase and posting with income distribution and management features that can only be provided by Adverpost's patented features, functions and technologies.

This appendix covers and compares all the key LED setup and operation utility programs for full colour LED screens. These programs include LEDShowT9, LEDStudio, LEDEditor and LEDVision.

Example of Receiving Cards

A8 Receiving Card: Colorlight Manufacturer; Synchronous/Asynchronous Type; 256 x 256 (True Color) and 1024 x 512 (Single Color) of Maximum Resolution separate. Maximum Grey Level: 65536. LEDSHOWT9 is the controller software.

A5 Receiving Card: Colorlight Manufacture; Synchronous Type; 256 x 256 (True Color) and 256 x 256 (Single Color) of Maximum Resolution separate. Maximum Grey Level: 65536. LEDVISION 2.0 is the controller software.

K10 Receiving Card: Xixun Manufacture; Asynchronous and Slaves Type; 640 x480 (True Color) and 640 x 480 (Single Color) of Maximum Resolution separate. Maximum Grey Level: 65536. LEDEditor & LEDset 2.0 controller software.

K20 Receiving Card: Xixun Manufacture; Asynchronous and Slaves Type; 640 x480 (True Color) and 640 x 480 (Single Color) of Maximum Resolution separate. Maximum Grey Level: 65536. LED editor & LEDset 2.0 controller software.

D10 Slave Receiving Card: Xixun Manufacture; Asynchronous and Slaves Type; 640 x480 (True Color) and 640 x 480 (Single Color) of Maximum Resolution separate. Maximum Grey Level: 65536. LED editor & LEDset 2.0 controller software.

Led Flash Module Array setup and testing programs comparison chart follows.

Led Flash Module Array setup and testing programs comparison chart follows.

Features	LEDSHOWT9	LEDEditor	LEDStudio
Version	11.3	9	10
Multiple Language Support	Yes	Yes	Yes
Async Support	Partial	Partial	No
Sync Support	Yes	Yes	Yes
Send Content	Yes	Yes	No
Brightness Control	Yes	Yes	Yes
Remote Control	Partial	Yes	Partial
Program Looping	Yes	Yes	No
Schedule Support			
Brightness	Yes	Yes	No
Power Control	Yes	Yes	Yes
Program	Yes	Yes	Yes
Screen Capturing	Yes	No	Partial
Screen Recording	Yes	Yes	Yes
Text			
Multi-Line Text	Yes	Yes	Yes
Transition Effects	Yes	Yes	Yes
Text Colouring	Yes	Yes	No
Rich Text	Yes	Partial	Yes
Background Images	Yes	Yes	Partial
Transparency	Yes	No	Partial
Boards	Yes	Yes	Yes
Video			
Aspect Scaling	Yes	Yes	Yes
Video Scaling	Yes	Yes	Yes
Transition Effects	Yes	Yes	Yes
Video Clipping	Yes	Yes	Yes
Boards	Yes	Yes	Yes
Image			
Transition Effects	Yes	Yes	Yes
Transparency	Yes	No	Partial
Aspect Scaling	Yes	Yes	Yes
Boards	Yes	Yes	Yes
Animated(.gif)	Yes	No	No
Other Content			
Scoreboard Manger	Yes	No	Partial

One World LED Software Packages User Guides

LEDSHOWT9 Introductory User Guider

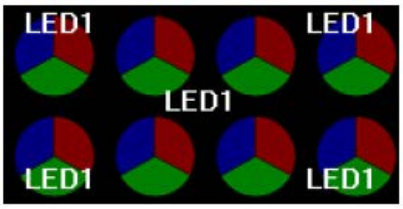
The LEDShowT9 software package is used to control, configure and manage content of LED displays that use A8 receiving cards. LEDShowT9 is one of the most commonly used software for our screens at One World LED and has a simple GUI interface supporting many screen customization and display features.

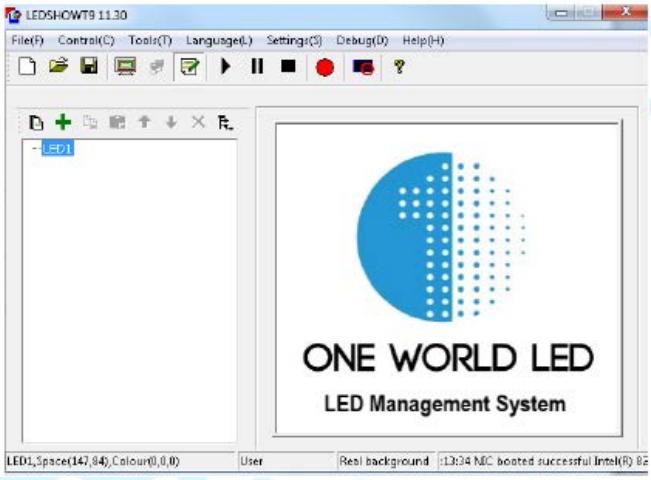
This guide will provide basic instructions on how to:

- Configure the display
- Add and manage content
- Create an automated running schedule

Overview:

The two main features of LED Show are the Control Window and Play Window. The control window allows you to configure and control your screen and create display programs. The play window shows a preview of what is being displayed on your LED screen.



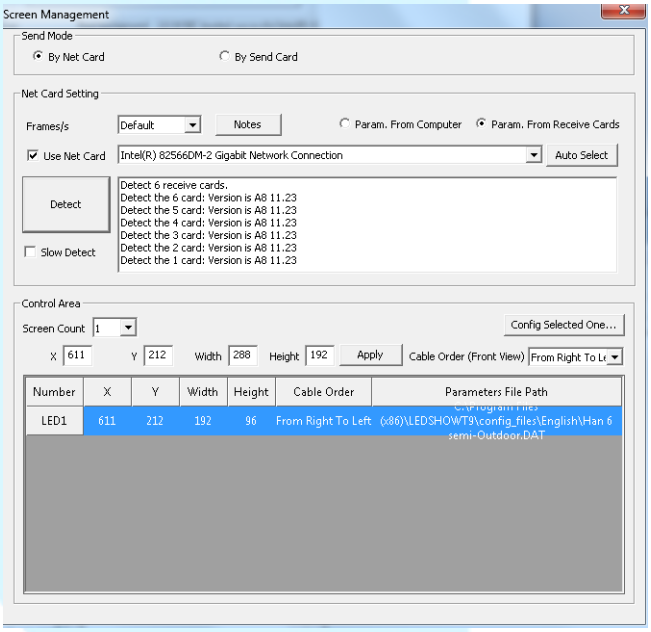


Capabilities/Strengths
Simple easy to use interface
Customize your display
Configure and calibrate the screen
Play Videos and Images
Text, clock and timers
Play PowerPoint presentations Send offline
Content Capture Screen Mode
Create Automated Function Schedule
Real Time Scoreboard Manager

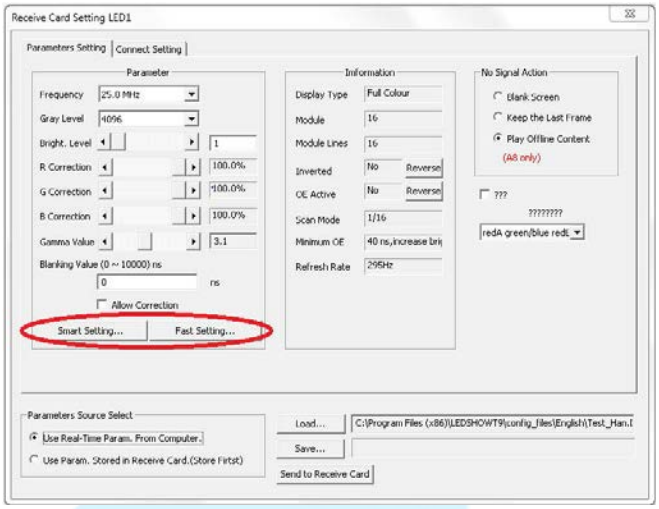
Weaknesses
Cannot directly play internet streams
Only compatible with A8 receive cards
Does not support .mp4 video file format
Limited scan rates

Configuring the Display

First, ensure that the screen is powered on and the computer is connected to the first receiving card of the flash module array of the Led dispaly via Cat-5 cable.
In the control window, go **Control > Screen Management**.
In the Screen Management window click Detect to ensure that all receiving cards are detected. Enter the width and height measurements for your screen and click apply.

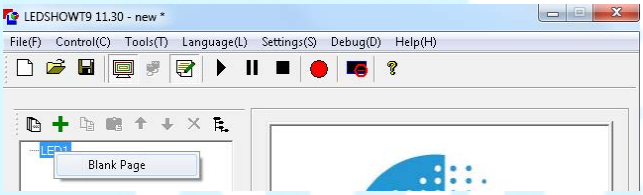


Next click **Config Selected One** and enter the password “t9”. One World LED will provide you with the config file for your screen. Simply click **Load** and then select the appropriate config file. When done click **Send to Receive Card**.

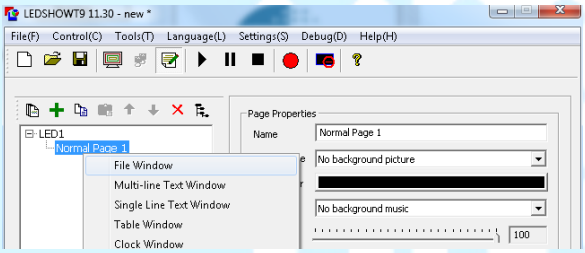


Playing and Managing Content: Images and Videos

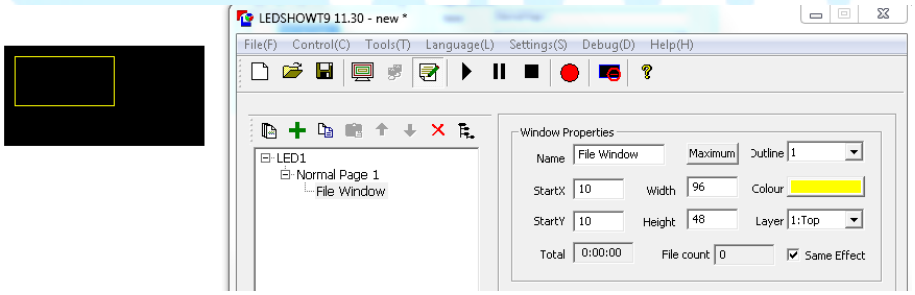
In the control window right click LED1 and select Blank Page.



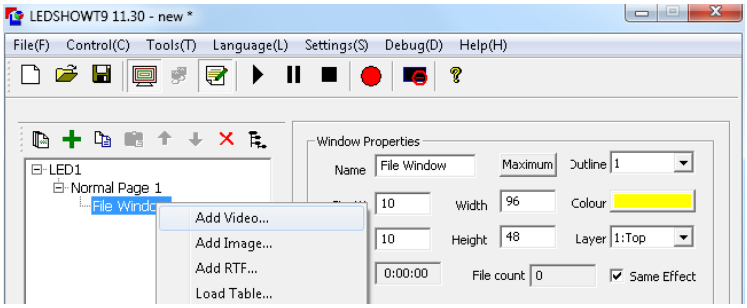
Right click Normal Page 1 and select File Window.



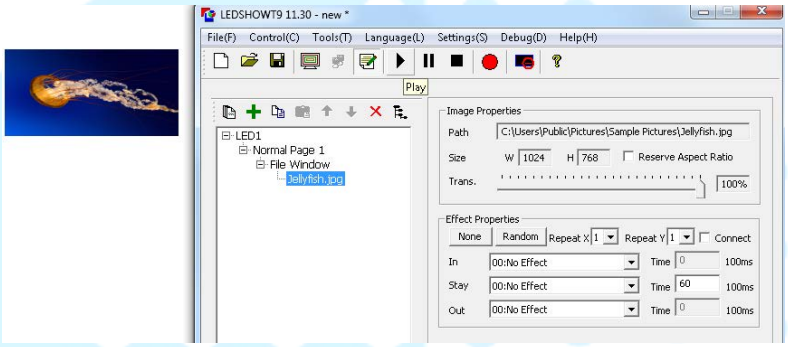
The File Window will appear in the Play Window. Here it can be dragged and resized with the cursor. Alternatively, coordinates and dimensions can be entered in the control window. To make the File Window the same size as the screen click **Maximum**.



To add an image or video right click File Window and select Add Image or Add Video. Then simply choose a file from your hard drive.

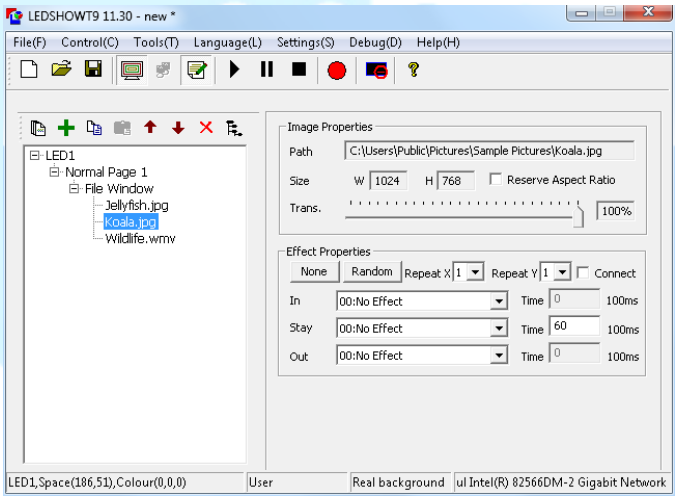


Click the play button on the toolbar to preview your program. It will display in the play window and the LED Screen (if connected). To disable entrance/exit effects for images click **None** under Effect Properties.



Playing Consecutive Files – Creating a Display Loop

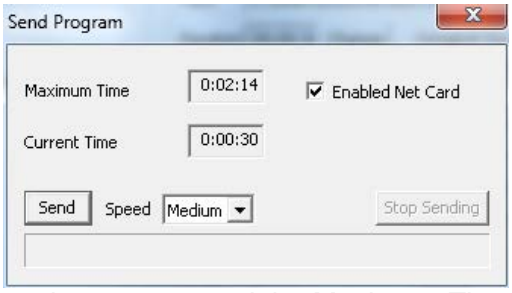
To play consecutive images and videos simply add them to the File Window as before. The play order can be changed sing the arrow buttons. All the images and videos will play consecutively in a continuing loop.



The duration for images can be changed by entering the desired time in the Stay section. In the above example the Koala picture will play for 6 seconds.

Sending Content for Offline Mode

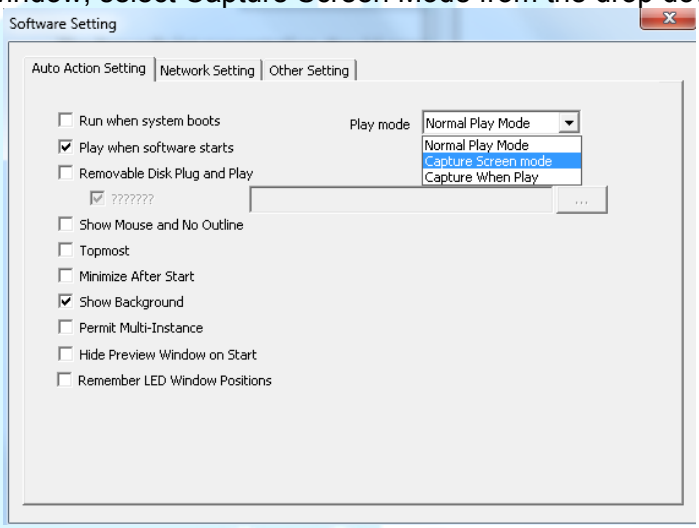
This is how you tell your LED Screen what to play or operate in asynchronous mode when it is not connected to your computer (i.e. in offline mode). Open the display program you want to send, then go to **Control > Send A8 Content > Send Program**.



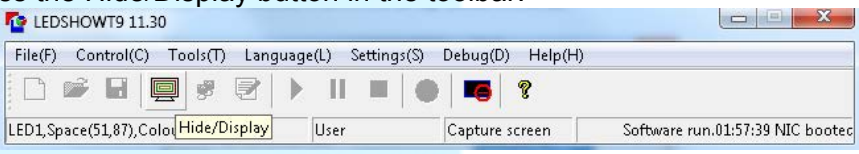
Ensure that the Current Time does not exceed the Maximum Time and then click Send.

Screen Capture Mode

LED Show has a function to “Capture” a section of your computer screen and display it on the LED Screen. To enter screen capture mode go **Settings > Software Settings**. In the Software Settings window, select Capture Screen Mode from the drop down menu.



The LED Screen will capture whatever is displayed under the Play Window. To begin/stop capturing press the Hide/Display button in the toolbar.

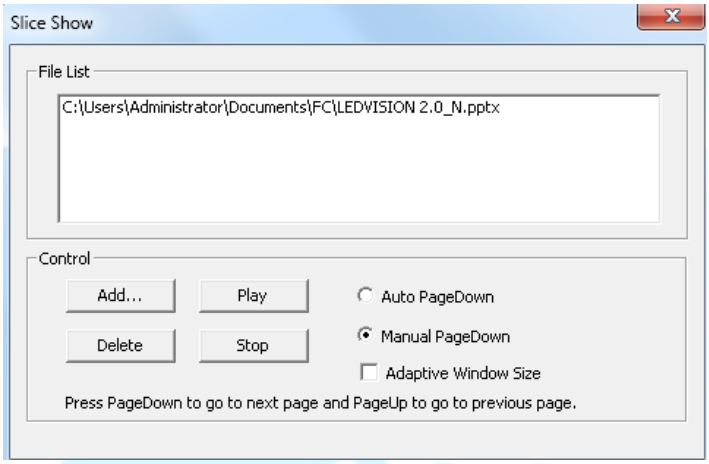


Screen Capture is useful for several applications such as playing Youtube videos and Live Internet Streams.

Playing a Power Point Presentation

Go to **Control > Play PowerPoint**.

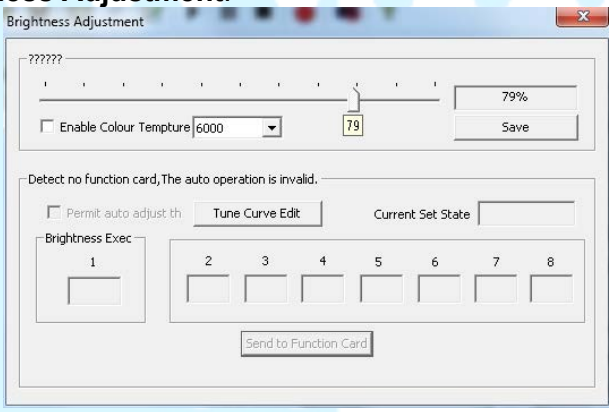
If asked to switch to screen capture mode select “yes.” Click Add and choose your PowerPoint file, then click Play.



The PowerPoint presentation should appear in the Play Window and your LED Screen. Click the Play Window to change slides or use the Page Up and Page Down keys. Selecting "Adaptive Window Size" will resize your PowerPoint to fit the dimensions of the LED screen. (**NOTE:** Remember to change back to "Normal Play Mode" in the software settings when done.)

Adjusting Screen Brightness

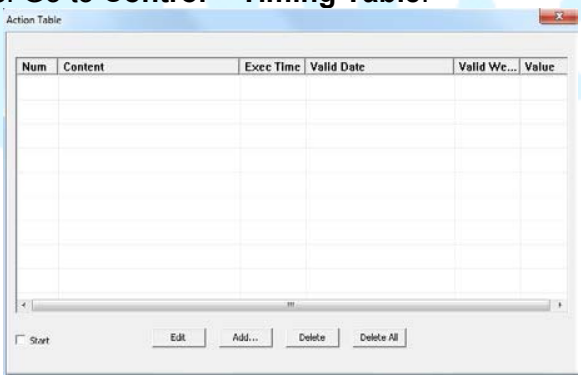
Go **Settings > Brightness Adjustment**.



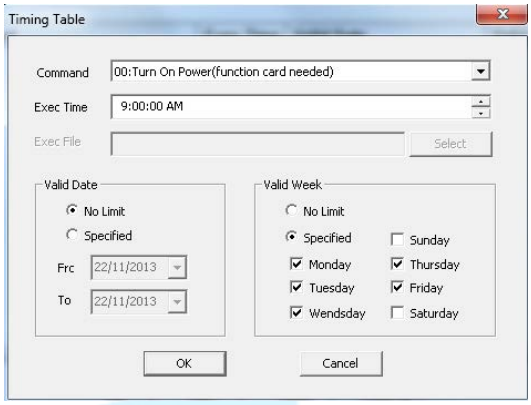
Move the slider to select the desired brightness then click Save.

Creating a Schedule

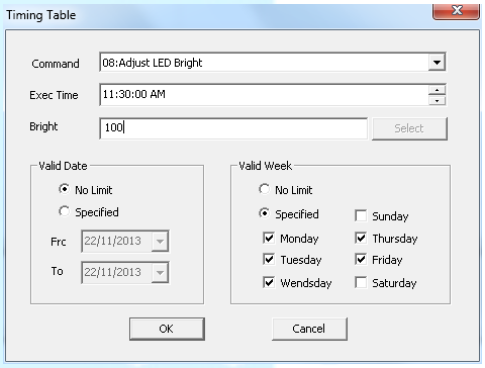
LED Show allows you to create a schedule for your screen to automatically turn on/off and adjust screen brightness. Go to **Control > Timing Table**.



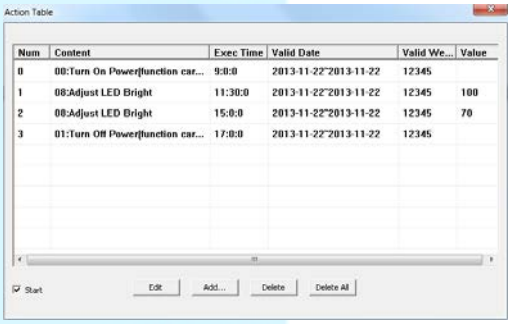
Then click Add. From the Command drop down menu you choose your desired action such as turning the power on/off or adjusting the brightness. Choose when you want it to happen in the Exec Time field. You can also specify a range of dates and which days of the week you want this action to apply.



In the above example the LED screen will turn on at 9am from Monday to Friday. After completing programs, click **OK**. The action will now appear in the timing table. Brightness adjustment commands are added in a similar fashion, entering the brightness level percentage in the “Bright” field.



Shown below is an example of a commonly used schedule, which runs on weekdays to turn the screen on and off and adjust brightness levels according to the level of sunlight.



NOTE: Make sure Start is selected to run your schedule.

LedEditor

Description:

“LedEditor” is a set of editing and making program software and designed to be used for asynchronous LED display screen. A lot of powerful functions are included. Moreover, this software application is simple for everyone to use and learn.

- Operating Environment Simplified Chinese, Traditional Chinese or English WINDOWS XP, Vista
- Hardware Configuration CPU: Pentium 600MHz or above, ROM: 512M
  Graphics card: Standard VGA 256 mode or above
- Related Software - Microsoft Media Player-compulsory

Detailed Description:

LED Editor is LED sign software with network capabilities that allows the software to control the LED sign through the network, meaning that the sign can be further away as long as it is connected to the network. The auto-importing and adjustment function in the LED sign software makes it easy to insert media files to the LED sign.

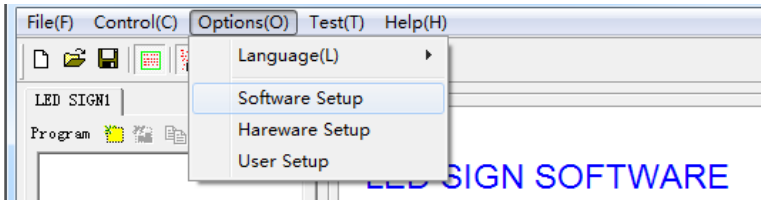
LED IP address: The real IP address of LED screen. Computer IP: Local IP address. Need to ensure that network selection of LED IP is the same with computer IP.

Setting the size of the playing window:

The size of each LED panel should be set correctly with width and height of LED screen (pixels). Otherwise, the contents of program will not be sent Or only some parts of the contents can be displayed on the screen.

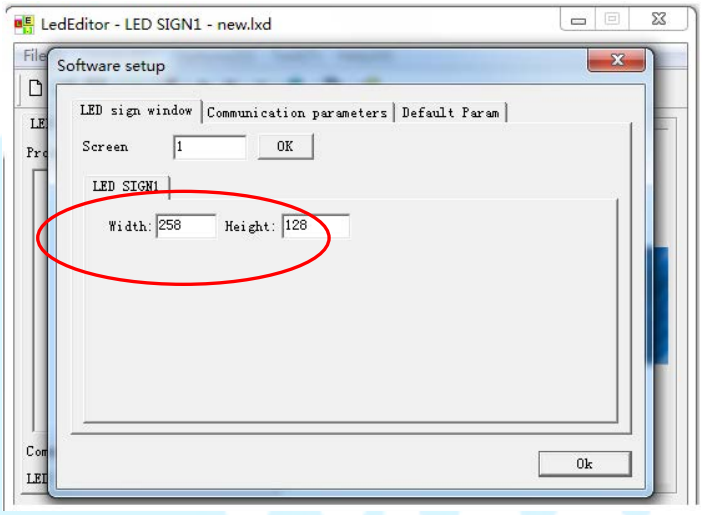
How to configure the setup of LED screens:

Menu – Options – Software Setup. The quantity of LED screens should be typed correctly as well as width and height of screens.



Taking 2 screens with 256Width and 128Height as an example.

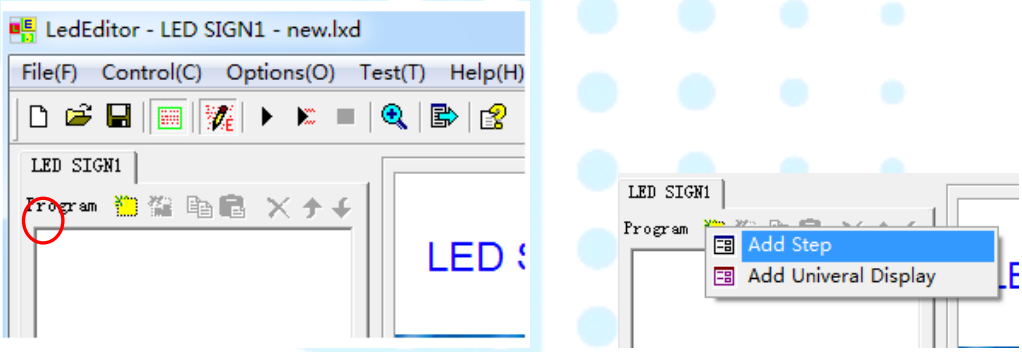
Note: Make sure the screen and size of LEDs set properly for different panels.



Create Program Pages:

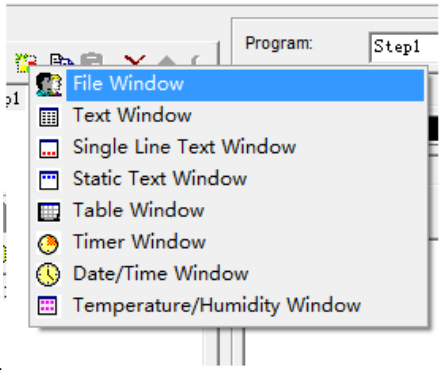
All kinds of contents will be added in the program pages. It allows users to choose videos, images, time, temperature, statistic line then play it in the LED screen.

Click on **New Program Page button**. Then **Add Step.**



Program windows can be added as many as we want by Clicking on **Create New Program** button and choosing the window from the optional lists.

File Window is the most normal one will be used because all supported files will be played here including Word files (RTF), all kinds of pictures (BMP/JPG/GIF), all kinds of media files (AVI/MPG/MPEG/WMV/ASF/MOV/FLV), VCD files (DAT), Flash files

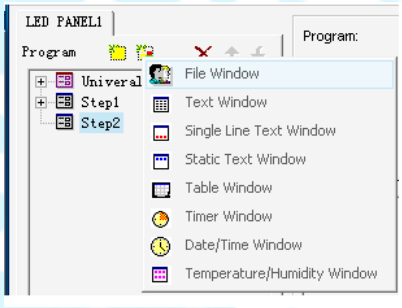


(SWF).

In this case, picture and date/timer display will be concerned.

Picture Display:

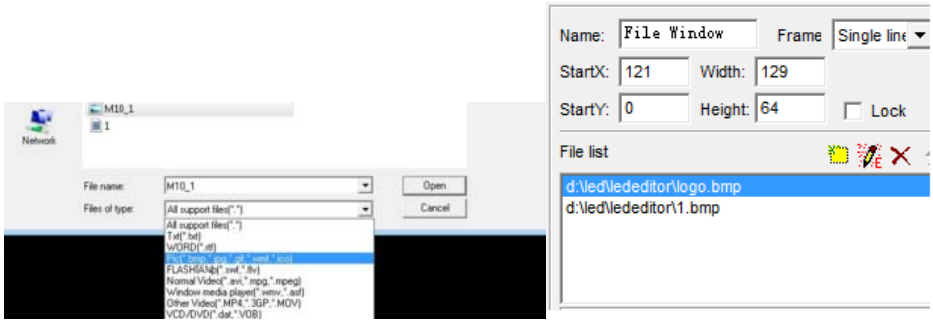
Click on the **New Window** button, then **File Window** in the menu.



Click on the **Add file** to open the file dialog box. Selecting the types of picture files in the lists. And, select the file we want to open in the box.

After opening the picture file, it can be seen in the file list. Also, we can add more pictures in the file list.

Note: Programs of pictures won't play in a loop. Only the top one will be displayed.

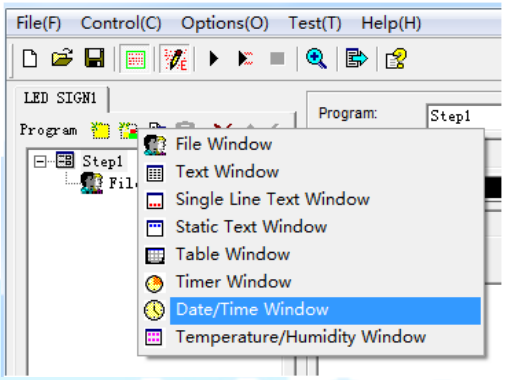


The position and size of pictures can be reset manually by dragging the mouse or typing the

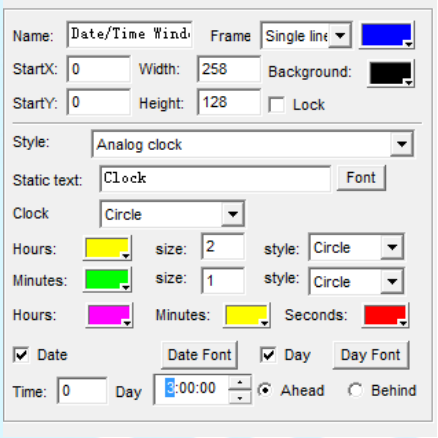
correct position of pictures we want it to be.

Date/Time Display:

Click on **New Window – Timer Window.**



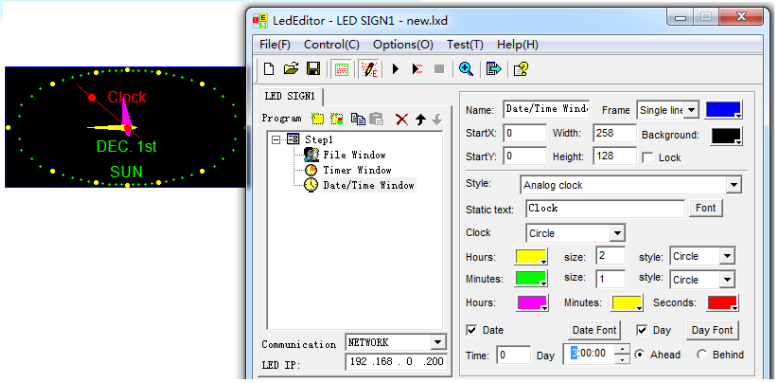
The program properties of date/time can be set with name, frame, starting point X, starting point Y, width, height, background and lock.



Two kinds of date/time displays will be chosen either analog clock or digital clock.

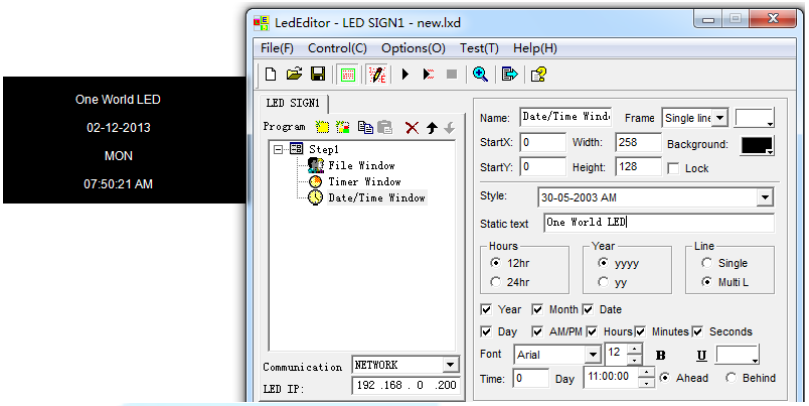
Analog Clock:

Style: Analog Clock. Static texts are Clock. And, Circle frame will be displayed with Hours in Purple, Minutes in Yellow and Seconds in Red. Date also is displayed in the frame.



Digital Clock:

By choosing digital clock style and putting words in static text, digital clock will be shown up with 12Hours and years in 4 digital in different lines.



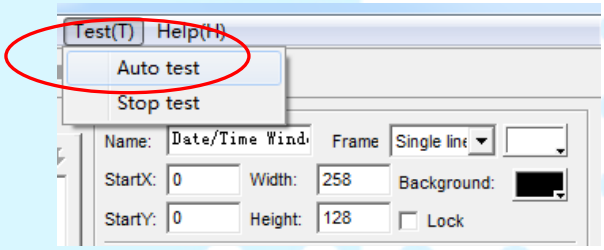
Note: Time can be set ahead or behind according to real situation.

Testing broken modules or wrong wires:

There are some issues happened in the LEDs screen probably because of wires or power supplies. Consequently, lights of LEDs may not work properly. And, contents of program will not be displayed. Checking each module with light test will prevent breaks of lights or other kinds of problems.

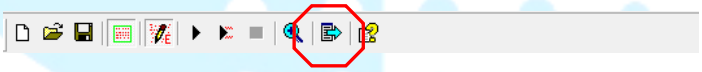
Test(T) – Auto test

Various colors will be displayed on the LED screen repeatedly. This is effective way to make sure every individual light working properly as well as contents of program.



Send Offline Mode:

Click on **Send to Led sign.**



Note: Once all contents and pages are added already, this step is going to tell LEDs what will play if data cable is disconnected.

LedStudio

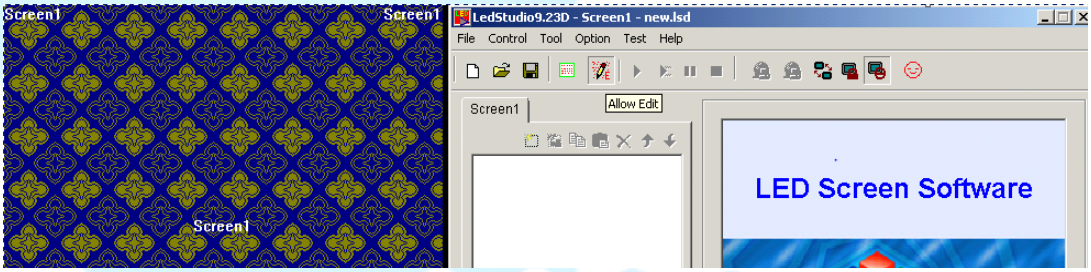
Description: LED Studio LED Display Flash Module Array Setup is programmed and produced for full colour LEDs by Linsn.

“LEDStudio”, is a practical and easy to use software for setting up and operating LED screens and or playing programs. It supports a range of formats, such as text documents, documents, pictures (BMP/JPG/GIF/PCX …) and videos file formats (MPG/MPEG/MPV/MPA/AVI/VCD/SWF/RM/RA/RMJ/ASF ...)

- Operating Environment: Chinese/English WINDOWS2000/XP/Vista
- Hardware Configuration: CPU: Pentium 300MHz or above ROM: 64M
- Graphics card: Standard VGA 256 mode or above
- Related Software: Microsoft Media Player-compulsory OFFICE2000-in case of *.doc files RealPlayer-in case of RealPlayer files

Detailed Description:

Program (Program document) consists of one or more than one program pages. There are two kinds of program page: normal program page and overall program page. Normal program pages are the main components of a program, so there may be many, they will be played in order, one after another; there should be only one overall program page, played throughout the playing process. It is mainly used for fixed contents’ broadcast, such as clock, company logo etc.



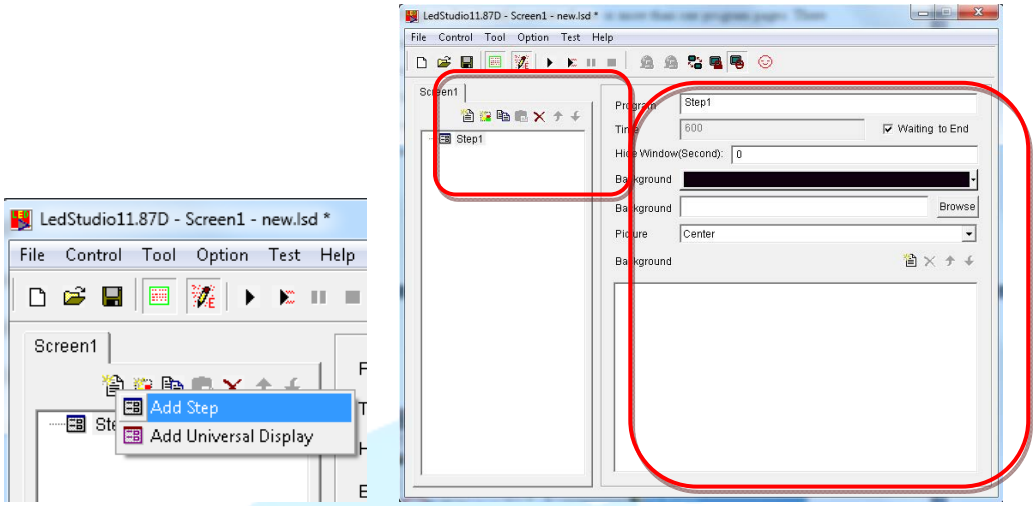
Program page consists of one or more windows, which is used to show the contents that users want to play, like documents, pictures, cartoons, multimedia segments etc.

New Program Page:

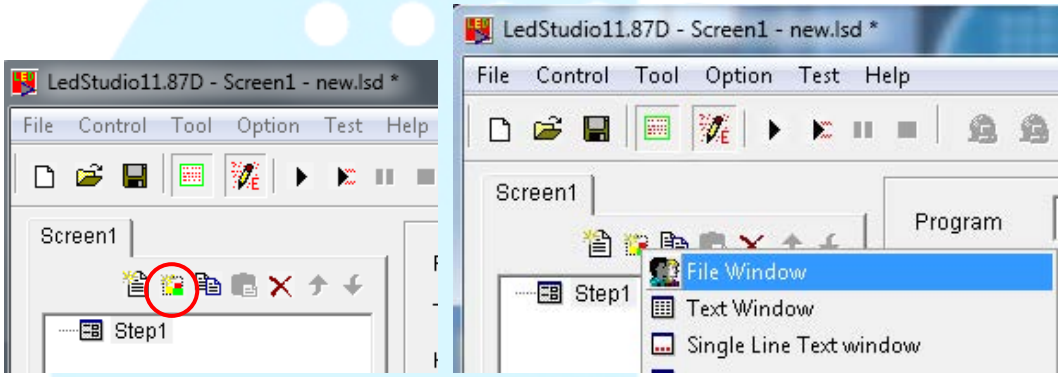
Program is a basic element of a program. Program page is only a frame and contains many windows. Each window can play different contents including words, pictures, tables and videos.

Click on **Edit** button to expand the control window. Then **Add Step.**

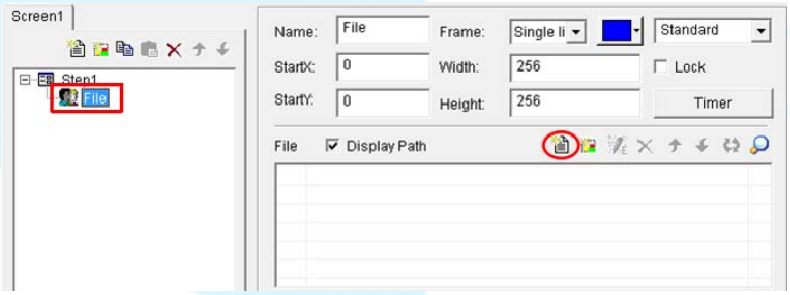
Control Window displays blank window on the right hand side.



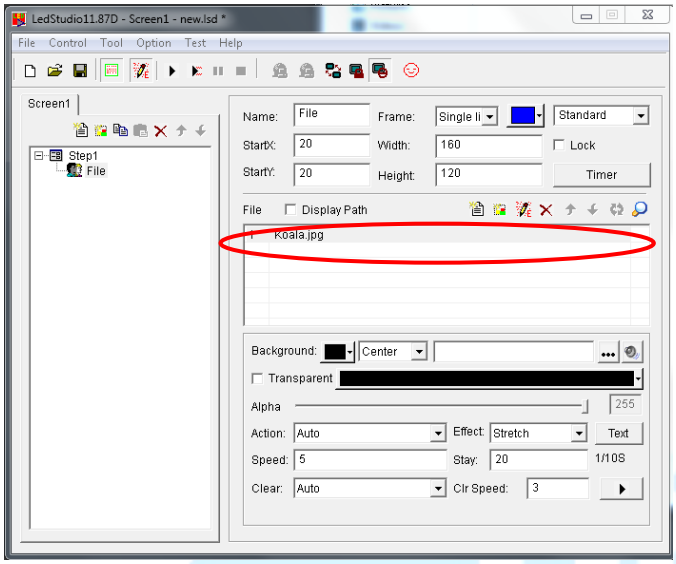
Click on **New Window**; choose the window from the lists. Taking Video Play as an example. To add a video, click on **File Window.**



Click on the **Add file** button on the control options pane, then choose the file to the desired video from computer or hard drive.

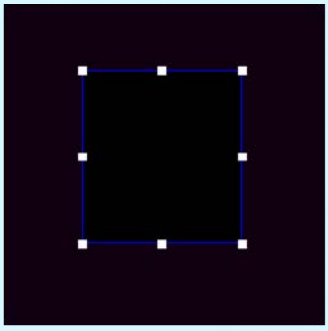


The video document has already been added to the playlist. It's easy to delete and swap the position.



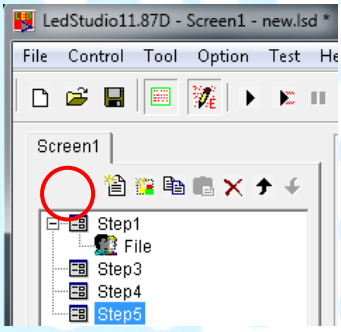
How to configure the screen size and position on the panels:

Click on the **Play Window** then drag it and resize the blue frame as displayed.

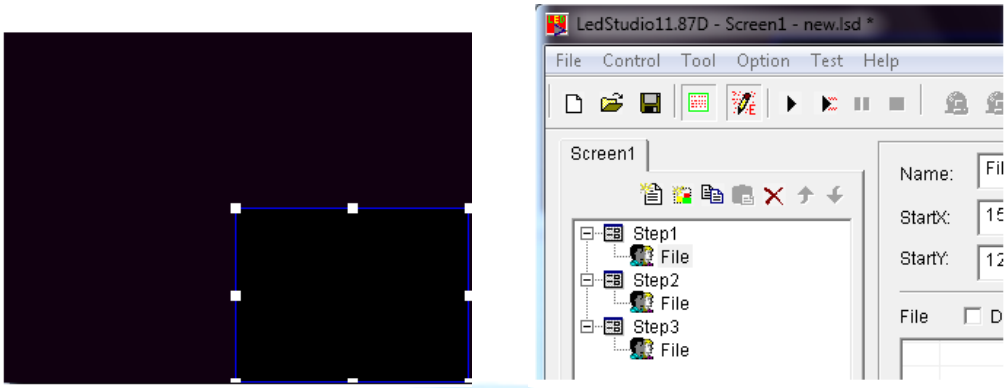


Playing multiple contents on the screen:

Click on the **New Window** to add more pages.



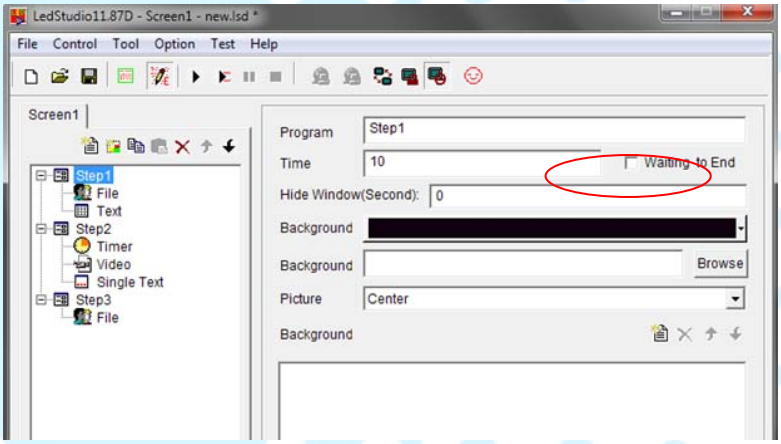
Select one page and drag the blue frame to resize and set properly position. Do the same procedure for each page on the lists.



Note: The position and resolution of the play window can be controlled by adjusting parameters based on “StartX, StartY, Width and Height”.

When multiple windows are set to one single window, it will play all files consecutively in a loop.

Unlock the waiting to end position for the desired time; the running length for each step can be changed.

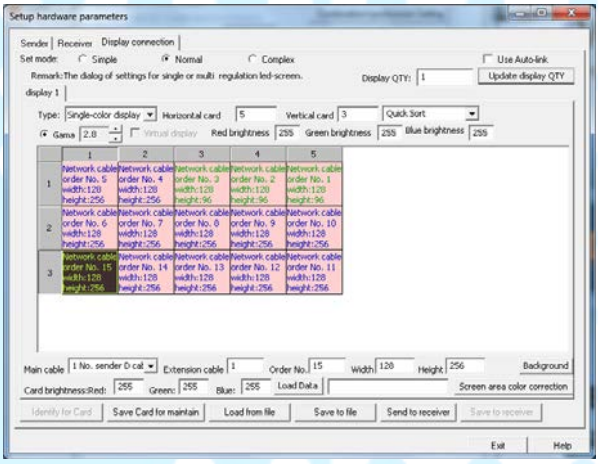


If LedStudio is working and no receiving cards are being detected, an error window will display wrong message on screen. No matter what kind of contents we have in the pages, nothing will be sent to the LEDs. This is an effect way to check the connection between LEDs and computer working well.

How to configure it:

Click on **Options Software Setup**, typing password **168**. And, the **Setup hardware parameters** window will appear.

Click on **Display Connection button**, LED panels will be setup here according to the real panels we have.

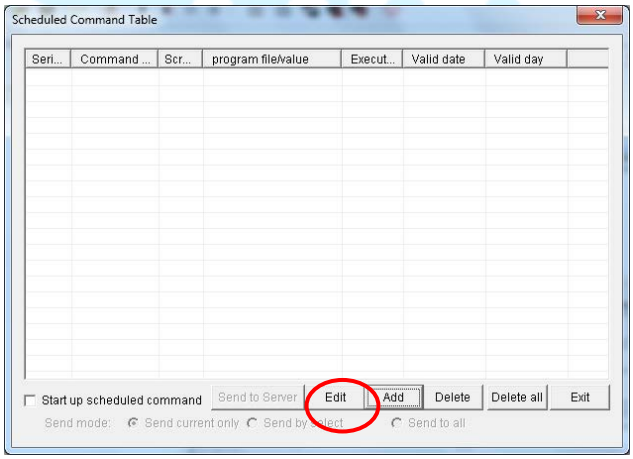


Note: the order No. connects to the physical setup on the grid.

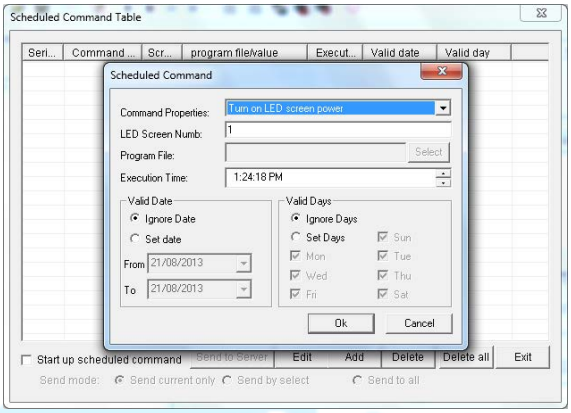
Time Management Control:

One of the functions can be beneficial from LedStudio is to set schedule for controlling LEDs screen in time. Time management control will not only prevent users from missing important events, but make everything running regularly.

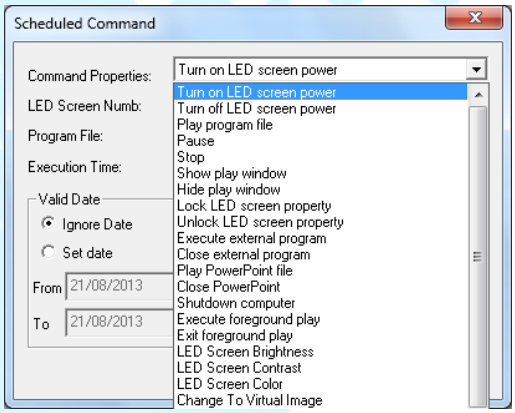
Click on the **Option** on the main menu and **Schedule Table.**



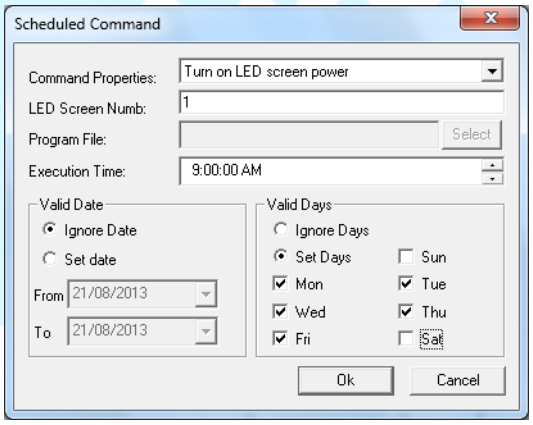
Click on **Add** to access to scheduled command dialog box.



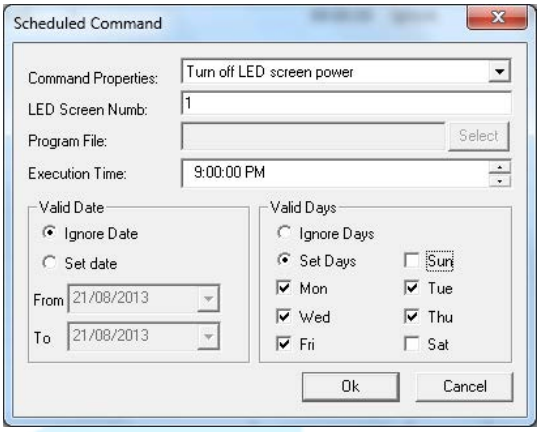
Select the command we want from the list. Here, automatic start and shutdown LED screen will be tested in this case.



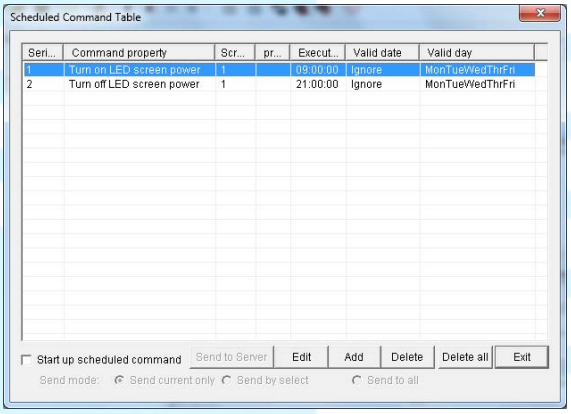
In the picture above, LED screen has been set to start at 9:00AM from Monday to Friday. And, click on **OK** button.



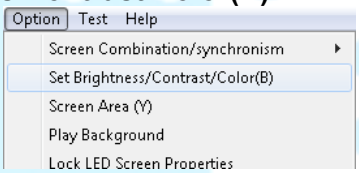
Add a new schedule command to turn off LED screen at 9:00PM from Monday to Friday. And, click on **Ok**. Anytime and time day can be set according to the real demands and personal performance.



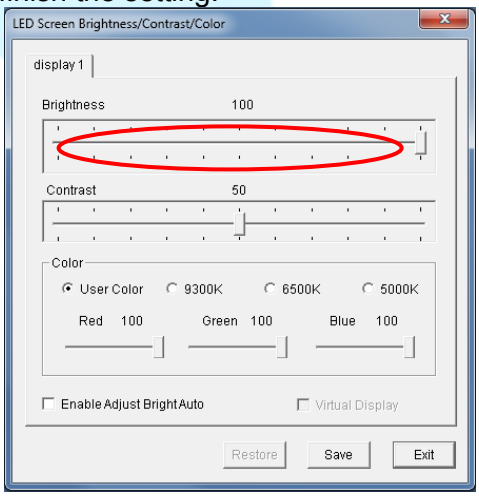
Two lines are presented on the Schedule Command Table. Either one can be deleted and set again by clicking on **Edit** button. Either one can be edited and deleted by clicking on the relative buttons.



Setting Brightness of LED screens:
Click on **Options Set Brightness/Contrast/Color(B)**.

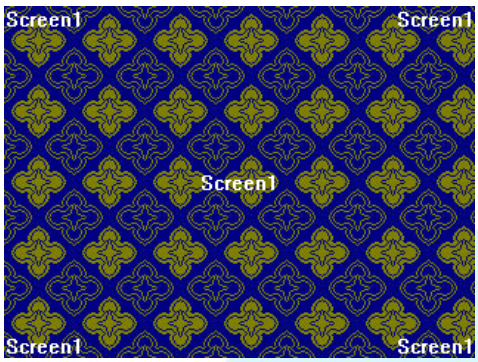


Drag the slider under the Brightness section to change the brightness of the screen to the best view. Click on **Save** to finish the setting.



Running Screen Capture:

There is no direct way to screen capture. But, the play window will capture everything displayed in the desired area by hiding the play window.



Note: The size of contents (videos media, pictures, internet stream …) which will be displayed should set the correct size as play window. If the size of contents exceeds or is less than play window, blank parts will appear and some part will not be displayed.