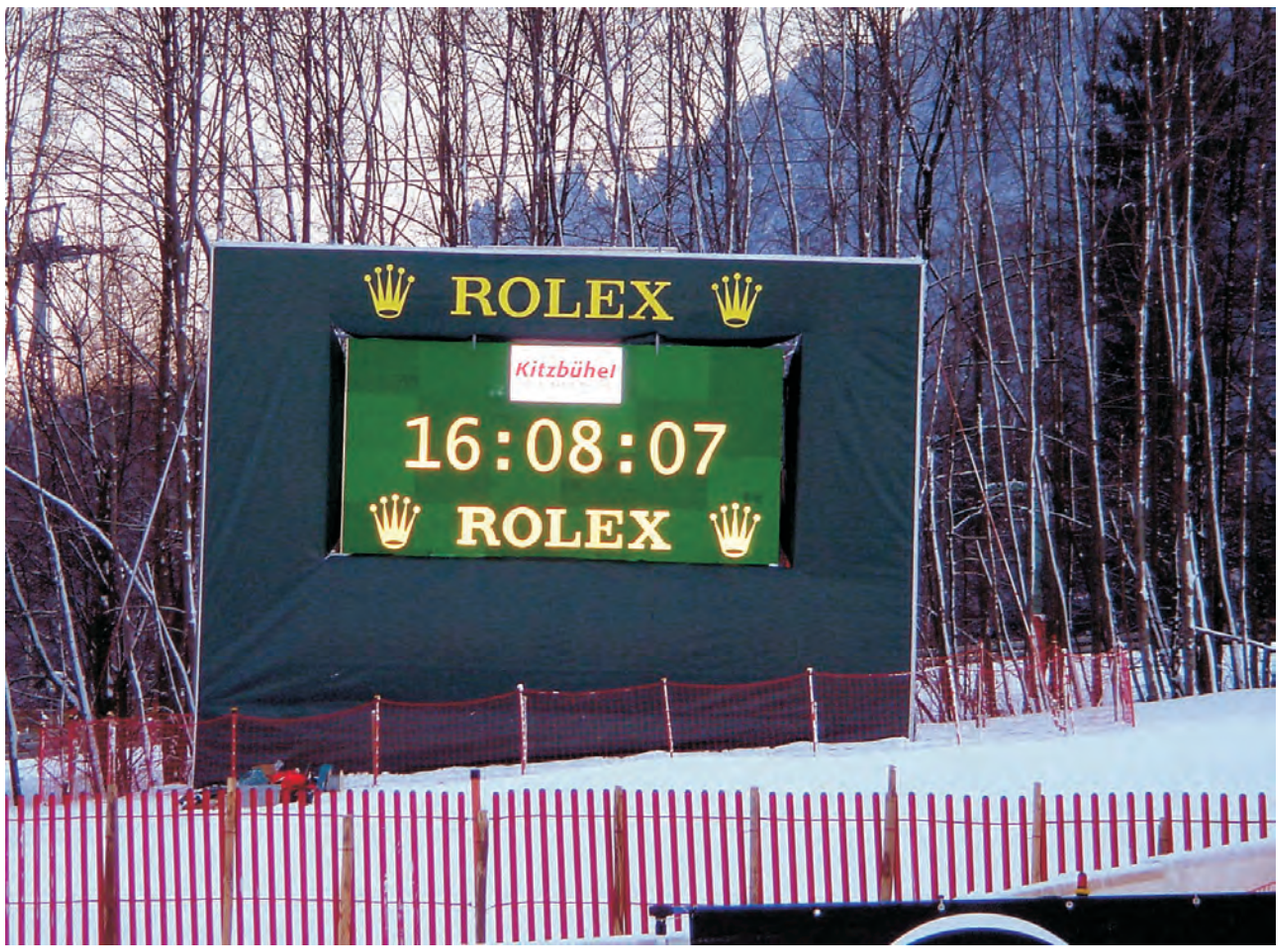
LED Stadium Scoreboards



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LED-Scoreboard Systems

LED-Matrix Boards are very complex. A lot of specifications influence the price. We would like to give you a short introduction on different terms that are used for LED-Matrix Boards:

Pixel: One pixel is the smallest point you can show with a Matrix-Scoreboard. Any pixel can consist of several LED's.

Pitch: Describes the distance from pixel to pixel. In general, the pitch starts with 4 mm and goes up to 50 mm. The smaller the pitch, the better the resolution and the more expensive the board per m².

Pixel Size: The bigger the pixel dimension compared to the pitch, the sharper the picture (fill grade).

LED/Pixel: Any pixel can consist of one or more LEDs. The more LEDs per pixel the better the scoreboard. But the quality also depends on the type of the LEDs. In our full color LED-Screens we only use Nichia LEDs that have the best performance.

Resolution: The resolution is the amount of pixels in vertical and horizontal order. The higher the resolution, the better is the quality of the picture or text!

Pixelsharing or virtual pixels: The pixelsharing mode is using LEDs from adjoining pixels to construct virtual pixels. The virtual resolution is four times higher than the physical amount of pixels.

But the picture quality of a physical videowall with 16mm is much better than the one of a 16 mm shared mode!

Luminosity: The luminosity is measured in cd/m² or in Nit (Candela per square meter) and is important for the brightness of the board. This technical characteristic is also stated in different ways.
Some producers will quote the luminosity for all colors are in maximum brightness. Any serious producer will specify the brightness in the white-balanced state.
Different colored scoreboards need different luminosity for outdoors.

1 color	2000 cd/m²
2(3) colors	3500 cd/m²
full color	5000cd/m² in white-balanced state!!

For full color scoreboards it is very important to indicate the luminosity in white-balanced status. Some manufacturers will state the brightness in all colors with 100%. This can result in a brightness of 8.000 cd/m², but after the board is calibrated (white-balanced) it means actually 5.000 cd/m²!

Viewing Angle: This is a dimension that is not 100% the same for different manufacturers. Some producers define the maximum angle as before the scoreboard gets dark. This is a poor definition!
All serious manufacturers will define the half-center brightness, which means in simple words the angle where you still have 50% of the full luminosity!

Refresh rate: The higher the refresh rate the more soft-focus is the picture.
We have a standard refresh rate of 240 and for the professional series we have a refresh rate of 500.

Static or Multiplexe Driving: The driving method of the LEDs should be static.

You can test this with a digital camera, just watch the video-wall and see if there is a flicker in the picture of the camera.

The same will happen if a TV-Camera films the video-screen and it is broadcasted on TV.

Outdoor: The LEDs are completely sealed with a special silicone and horizontal layers are integrated in the LED modules to maximize the contrast.

1 Color: The display features only one color (e. g. red). This color can have different shades to create a better picture (e. g. 256 shades, like a black and white picture). Most of these displays are also able to show animation-files.

2(3) Color: The display consists of LEDs with two different colors in each pixel (red and green). This two colors can be mixed so we can have more than 4000 colors. But all colors are in red, green and yellow tones.

Video Wall: The display offers LEDs with three different colors in each pixel (RGB – red, green, blue). These colors can be mixed so it has the complete true color spectrum (68 million colors). Such a board has a video input and it is able to show a TV picture. There are also scoreboards available with 10 bit color processing which will result in 1073 million colors.

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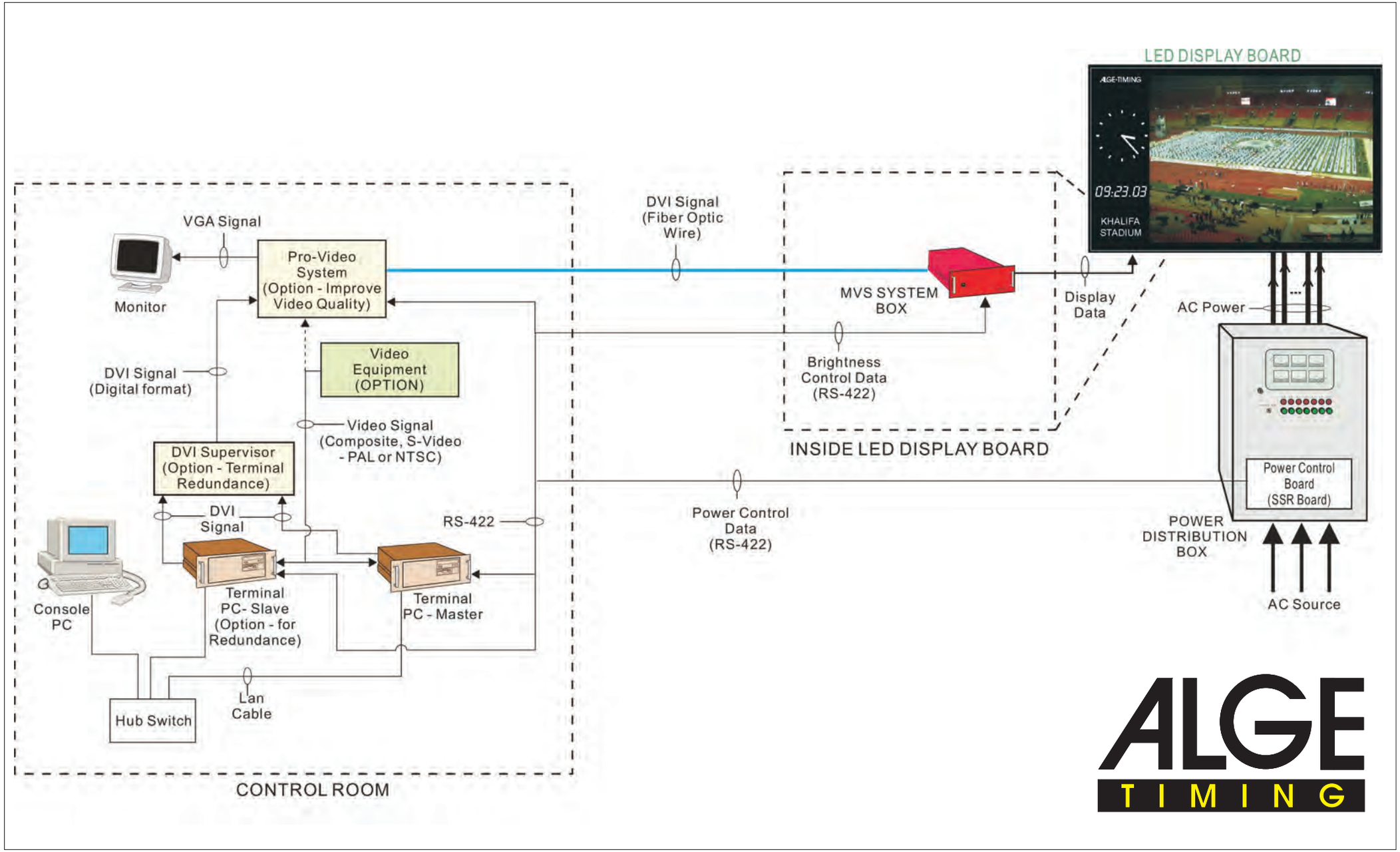
LED DISPLAY BOARD
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KHALIFA STADIUM
VGA Signal
Monitor
Pro-Video System (Option - Improve Video Quality)
DVI Signal (Fiber Optic Wire)
MVS SYSTEM BOX
Display Data
AC Power
Brightness Control Data (RS-422)
INSIDE LED DISPLAY BOARD
DVI Signal (Digital format)
Video Equipment (OPTION)
Video Signal (Composite, S-Video - PAL or NTSC)
DVI Supervisor (Option - Terminal Redundance)
DVI Signal
RS-422
Power Control Board (SSR Board)
Power Control Data (RS-422)
POWER DISTRIBUTION BOX
AC Source
Console PC
Terminal PC- Slave (Option - for Redundance)
Terminal PC - Master
Lan Cable
Hub Switch
CONTROL ROOM
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We can offer the following models:

Type	Pixel Pitch (mm)	Colors	LED per Pixel	Resolution per m²
Indoor				
KI-MVS-M4F1	4,0	68,719 Millionen	1RGB	62.500
KI-MK-MS-N06R1	6,0	R	1R	27.778
KI-MK-MS-N06D1	6,0	1,073 Millionen	1R,1YG	27.778
KI-MVS-M6F9	6,0	68,719 Millionen	1R,1G,1B	27.778
KI-MVS-M8Fx	8,0	68,719 Millionen	1R,1G,1B	15.625
KI-MVS-M10Fx	10,0	68,719 Millionen	1R,1G,1B	10.000
Outdoor				
KI-MVS-M8F1	8,0	68,719 Millionen	1R,1G,1B	15.625
KI-MVS-M10F1	10,0	68,719 Millionen	1R,1G,1B	10.000
KI-MVS-M125F1	12,5	68,719 Millionen	1R,1G,1B	6.400
KI-MVS-M14F1	14,0	68,719 Millionen	1R,1G,1B	5.102
KI-MK-MS-U16A1	16,0	Amber 256	2A	3.906
KI-MK-MS-U16D1	16,0	R/G each 256	1R,1G	3.906
KI-MVS-M16V	16,0	68,719 Millionen	1R,1G,1B	3.906
K-MVS-U20A1	20,0	Amber 256	4A	2.500
K-MK-MS-U20D1	20,0	R/G each 256	2R,1G	2.500
K-MVS-M20FV	20,0	68,719 Millionen	2R,1G,1B	2.500
K-MK-MS-U22A1	22,0	Amber 256	4A	2.066
K-MK-MS-U22D1	22,0	R/G each 256	2R,1G	2.066
K-MVS-M22F1	22,0	68,719 Millionen	2R,1G,1B	2.066
K-MK-MS-U25A1	25,0	Amber 256	4A	1.600
K-MK-MS-U25D1	25,0	R/G each 256	2R,1G	1.600
K-MVS-M25F1	25,0	68,719 million	2R,1G,1B	1.600
K-MK-MS-U28A1	28,0	Amber 256	6A	1.276
K-MK-MS-U28D1	28,0	R/G each 256	4R,2G	1.276
K-MVS-M28F1	28,0	68,719 Millionen	4R,2G,2B	1.276
KI-MK-MS-U32A1	32,0	Amber 256	8A	977
KI-MK-MS-U32D1	32,0	R/G each 256	4R,2G	977
KI-MVS-M32F1	32,0	68,719 Millionen	4R,2G,2B	977

Indoor models have a smaller pitch, no sun protection against direct sun light and are not sealed water proofed at the front. Because the indoor boards are not made for operation in direct sunlight, they do not have the same luminosity as the outdoor models.

Outdoor models have sun blockers (to protect the board against direct sun light) and are sealed water proofed at the front.

We use the following code for the LED color:

R .....Red
G .....Green
B.....Blue
YG...Yellow-Green
A.....Amber

Control PC and Software:
Each LED-Board has a 100 m fibre optic cable included in the control PC. The control PC has the standard software to operate the display board. Features like schedule, operation of more display boards, etc. are included in the software.

Other Specification:

Display: Text, Graphic, Animation, Video
Video Input: S-Video, Composite, DVI, VGA. SDI, HDTV
Video Format: NTSC and PAL
Display Speed: 800 fps
Pixelsharing: all full color modells

Modules:

We can offer two different modules:

a) **Aluminium Module:**
The aluminium case has the advantage that it cannot rust. It is recommendable if the display board is sometimes moved, or if it is under heavy duty.

b) **Mobile Module:**
This case is specially made for portable boards. The setup is simple and fast. Only a power cable has to be connected from the outside. The communication between the modules proceeds via fibreoptic cables.

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