



PRODUCT CATALOGUE

2014

Dear friends!

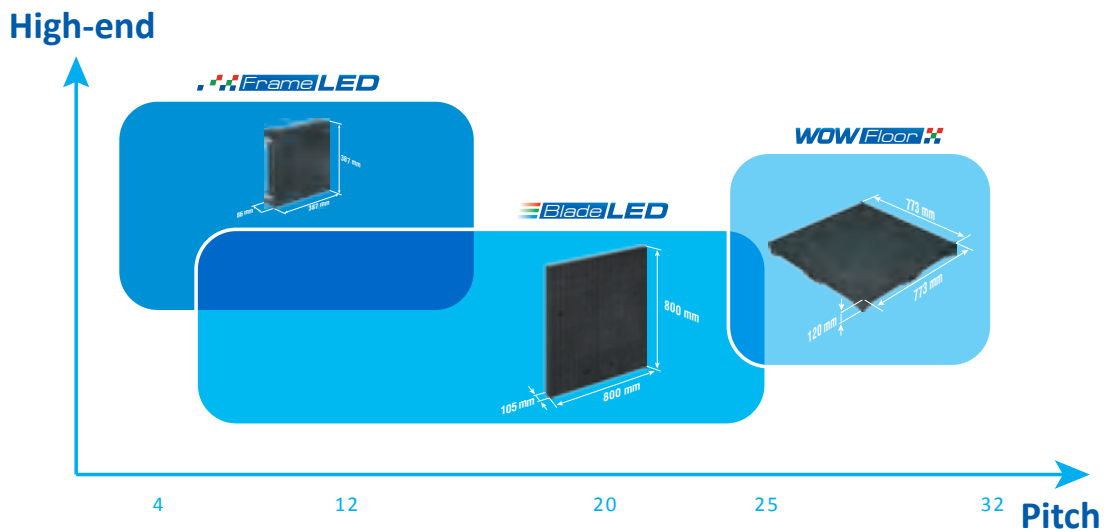
For more than 20 years we've delivered outstanding reliability and stunning performance. EKTA's innovative models of LED equipment and cutting-edge control systems have been developed for you to deliver the most challenging projects. These high-end LED solutions will once and for all change the image of your company - enabling you to be 'ahead of the future' with EKTA.

Igor PASTUKH
CEO, EKTA Company

MARKET APPLICATIONS

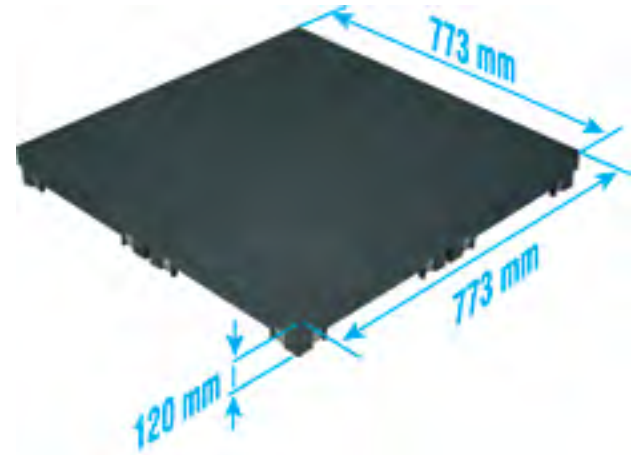
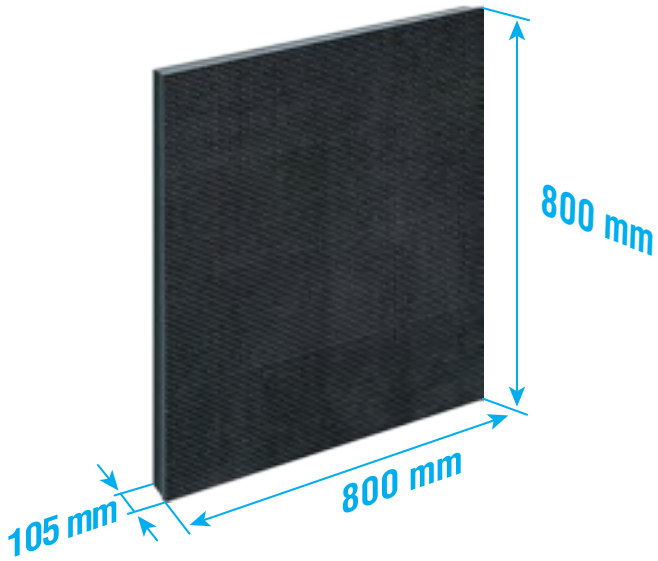
PROJECT	FIXED INSTALLATIONS			RENTAL
APPLICATION FIELD	TV&BROADCASTING	ADVERTISING/DOOH	SPORTS	EVENTS
CUSTOMER'S GOALS	<ul style="list-style-type: none"> original studio design technical solution for live backdrops flexible technology 	<ul style="list-style-type: none"> attractiveness for advertisers being different from competitors 	<ul style="list-style-type: none"> visual support multifunctionality 	<ul style="list-style-type: none"> Flexible solution excite, impress and inspire
CUSTOMER'S MAIN REQUIREMENTS	<ul style="list-style-type: none"> high reliability low heat generation silent operation compatibility with TV equipment 	<ul style="list-style-type: none"> extensive possibilities for Digital Signage WOW effect easy to control 	<ul style="list-style-type: none"> high resolution and image quality high reliability integrating with refereeing system 	<ul style="list-style-type: none"> quick and easy assembling and disassembling professional quality high reliability silent operation

EKTA SERIES

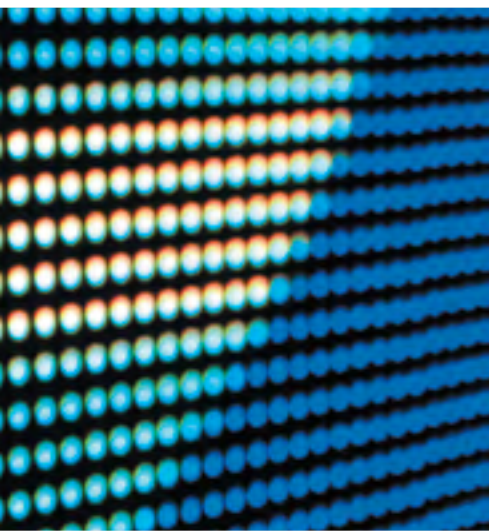




		EVENTS/TV		ADVERTISING/DOOH		SPORTS		RENTAL		REFERENCES, PAGE	
		INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	DATA SHEET	
FrameLED	SMD	iLVM 4C								9	
		iLVM 6C BEST SELLER								9	
		iLVM 8C								9	
		iLVM 9C BEST SELLER								9	
		iLVM 24C								9	
		iLVM 4C-Qs								8	
		iLVM 4C-Q BEST SELLER								8	
		iLVM 6C-Q BEST SELLER								8	
		LVM 6C-Q BEST SELLER									7
		LVM 9C BEST SELLER									7
		LVM 12C									7
		LVM 16C									7
	DIP	LVM 8C-vpR BEST SELLER									6
		LVM 10C-vpG									6
		LVM 12C-vpG BEST SELLER									6



		EVENTS/TV		ADVERTISING/DOOH		SPORTS		RENTAL		REFERENCES, PAGE	
		INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	INDOOR	OUTDOOR	DATA SHEET	
BladeLED	SMD	iLVM 8C-E								12	
		iLVM 10C-E								12	
		iLVM 12C-E								12	
		LVM 8C-E									11
		LVM 10C-E									11
		LVM 12C-E									11
		LVM 16C-E									11
		LVM 20C-E									11
	DIP	LVM 16C-D-E BEST SELLER									10
		LVM 10C-vpG-E BEST SELLER									10
LVM 12C-vpG-E BEST SELLER										10	
WOWFloor	SMD	ILVF 24C								13	
		ILVF 32C BEST SELLER								13	



INDEX

LED PRODUCTS

FrameLED 6

BladeLED 10

WOWFloor 13

CONTROL UNITS 16

OPTIONS

FRONT MAINTENANCE 24

TOOL FREE MODULES 25

LED DISPLAY FEATURES 26

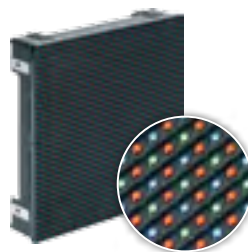
RANGE OF DISPLAY SURFACES 29

EKTA ADVANTAGES 30

TABLE OF SCREEN GEOMETRICAL SIZES AND SQUARES 36

FrameLED

OUTDOOR



Model		LVM 8C-vpR	LVM 10C-vpG	LVM 12C-vpG
Module type		LVM 16C-R	LVM 20C-G	LVM 24C-G
Display size		Display sizes can vary as a multiple of module dimensions		
Module dimensions, m		0.387 x 0.387 x 0.086		
Module resolution	- virtual pixels	48 x 48	40 x 40	32 x 32
	- real pixels	24 x 24	20 x 20	16 x 16
Pixel density, pixel/m ²		3,855	2,680	1,715
Pixel pitch, mm	- virtual	8.05	9.66	12.08
	- real	16.10	19.32	24.15
Number of LEDs in pixel		4 (2R-G-B)	4 (R-2G-B)	4 (R-2G-B)
LED type		DIP, 3 mm		
Colour processing, bit		16		
Colours		up to 281 trillion (48 bit)		
Viewing angle	- horizontal	140°	140°	140°
	- vertical	60°	60°	60°
Maximum brightness, NIT		15,000	11,500	9,500
Maximum calibrated brightness, NIT		10,500	9,000	7,500
Refresh rate, Hz		600 - 32,000	600 - 32,000	600 - 32,000
Minimum viewing distance, m		12	16	20
Lifetime		> 100,000 hours (> 11.5 years 24/7)		
Protection; operating temperature and humidity		IP65; from -30 °C to +40 °C, humidity up to 100% (25 °C)		
Power supply (single phase voltage)		220 V +15% -60%; 50 - 60 Hz		
Power supply (three phase voltage)*		380 V +10% -15%; 50 Hz		
Power consumption, W/m ²	- average	300	300	230
	- maximum	1,330	1,330	1,000
	- with calibrated brightness 6,000 NIT and T = 6,500°K	650	700	630
Module weight, kg		6	6	6
Display weight, kg/m ²		37.5	37.5	37.5

* Power supply according to US standard is available



LVM 6C-Q	LVM 9C	LVM 12C	LVM 16C
LVM 6C-Q	LVM 9C-S	LVM 12C-S	LVM 16C-S
Display sizes can vary as a multiple of module dimensions			
0.387 x 0.387 x 0.086			
-	-	-	-
56 x 56	40 x 40	32 x 32	24 x 24
21,004	10,715	6,855	3,855
-	-	-	-
6.90	9.66	12.08	16.10
1 (RGB: 3 in 1)			
SMD type, 4.0 x 4.5 mm			
18	16	16	16
up to 18,000 trillion (54 bit)	up to 281 trillion (48 bit)	up to 281 trillion (48 bit)	up to 281 trillion (48 bit)
150° +35°; -53°	150° +34°; -56°	150° 150°	150° 150°
7,000	7,000	7,000	6,500
6,000	6,000	6,000	6,000
7,200	600 - 32,000	600 - 32,000	600 - 32,000
5	8	10	14
> 100,000 hours (> 11.5 years 24/7)			
IP65; from -20 °C to +40 °C, humidity up to 100% (25 °C)			
220 V +15% -60%; 50 - 60 Hz			
380 V +10% -15%; 50 Hz			
270 1,150 500	300 1,330 600	300 1,300 600	300 1,330 700
5.4	6	6	6
36	37.5	37.5	37.5

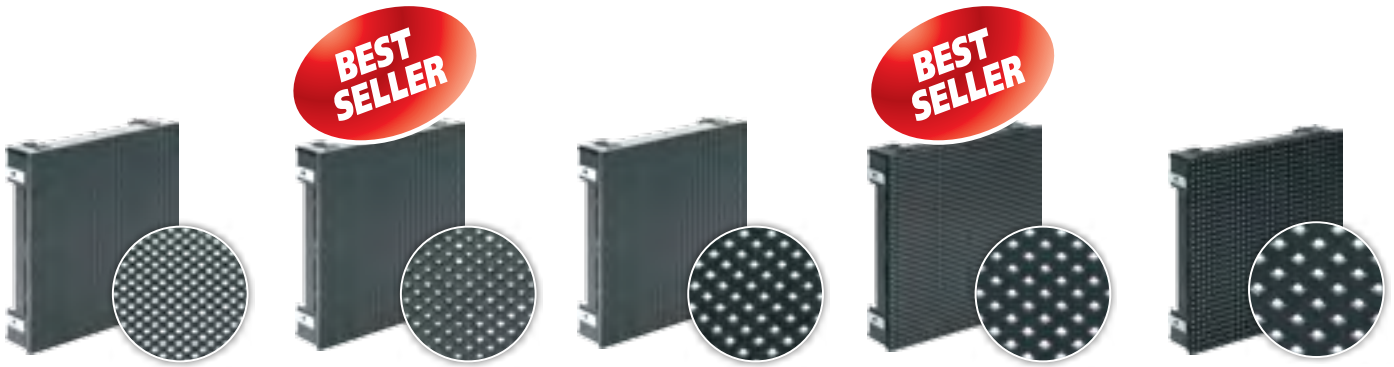
LED PRODUCTS

INDOOR



Model		iLVM 4C-Qs	iLVM 4C-Q	iLVM 6C-Q
Module type		iLVM 4C-Qs	iLVM 4C-Q	iLVM 6C-Q
Display size		Display sizes can vary as a multiple of module dimensions		
Module dimensions, m		0.387 x 0.387 x 0.086		
Module resolution	- virtual pixels	96 x 96	80 x 80	64 x 64
	- real pixels			
Pixel density, pixel/m ²		61,726	42,865	27,410
Pixel pitch, mm	- virtual	4.025	4.83	6.04
	- real			
Number of LEDs in pixel		1 (RGB: 3 in 1)		
LED type		SMD, 3 mm; black face		
Colour processing, bit		18		
Colours		up to 18,000 trillion (54 bit)		
Viewing angle	- horizontal	150°	150°	150°
	- vertical	150°	150°	150°
Maximum brightness, NIT		2,500	2,500	2,500
Maximum calibrated brightness, NIT		2,000	2,000	2,000
Refresh rate, Hz		7,200	7,200	7,200
Minimum viewing distance, m		2.5	3	4
Lifetime		> 100,000 hours (> 11.5 years 24/7)		
Operating temperature		from 0 °C to +40 °C		
Power supply (single phase voltage)		220 V +15% -60%; 50 - 60 Hz		
Power supply (three phase voltage)*		380 V +10% -15%; 50 Hz		
Power consumption, W/m ²	- average	300	300	300
	- maximum	1,250	1,330	1,330
	- with calibrated brightness	800	800	800
	2,000 NIT and T = 6,500°K			
Module weight, kg		5	5	5
Display weight, kg/m ²		32	32	32

* Power supply according to US standard is available



iLVM 4C	iLVM 6C	iLVM 8C	iLVM 9C	iLVM 24C
iLVM 4C	iLVM 6C	iLVM 8C	iLVM 9C	iLVM 24C
Display sizes can vary as a multiple of module dimensions				
0.387 x 0.387 x 0.086				
80 x 80	64 x 64	48 x 48	40 x 40	16 x 16
42,865	27,410	15,430	10,715	1,715
4.83	6.04	8.05	9.66	24.15
1 (RGB: 3 in 1)				
SMD, 3 mm				
16				
up to 281 trillion (48 bit)				
150° 150°	150° 150°	150° 150°	150° 150°	150° 150°
4,000	4,000	4,000	4,000	-
3,000	3,000	3,000	3,000	950
7,200	7,200	7,200	600 - 32,000	600 - 32,000
3	4	6	8	19
> 100,000 hours (> 11.5 years 24/7)				
from 0 °C to +40 °C				
220 V +15% -60%; 50 - 60 Hz				
380 V +10% -15%; 50 Hz				
380 1,150 640	380 1,150 640	380 1,150 640	380 1,150 640	150 450 330
5	5	5	5	5
32	32	32	32	32

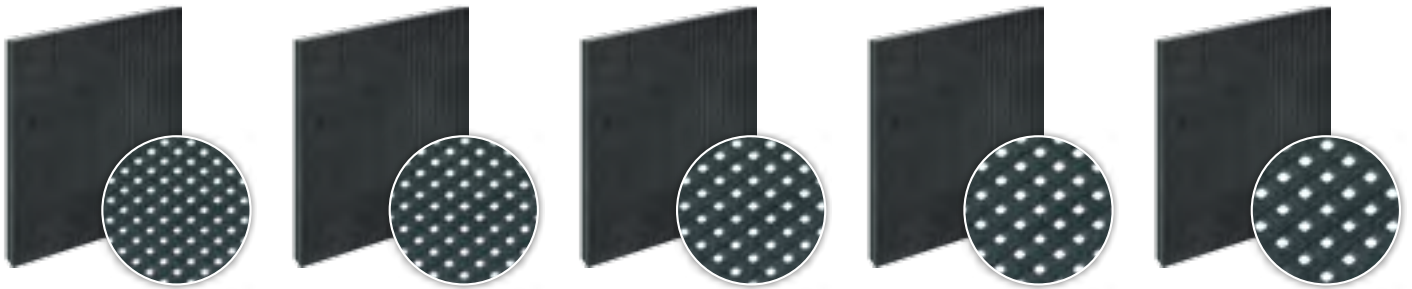
LED PRODUCTS

Blade LED

OUTDOOR



Model	LVM 16C-D-E	LVM 10C-vpG-E	LVM 12C-vpG-E
Module type	LVM 16C-8D	LVM 20C-8G	LVM 25C-8G
Display size	Display sizes can vary as a multiple of module dimensions		
Module dimensions, m	0.8 x 0.8 x 0.105		
Module resolution	- virtual pixels - real pixels	80x80 40x40	64x64 32x32
Pixel density, pixel/m ²	3600	2500	1600
Pixel pitch, mm	- virtual - real	10 20	12,5 25
Number of LEDs in pixel	3 (R-G-B)	4 (R-2G-B)	4 (R-2G-B)
LED type	DIP, 3 mm		
Colour processing, bit	16		
Colours	up to 281 trillion (48 bit)		
Viewing angle	- horizontal - vertical	140° 60°	140° 60°
Maximum brightness, NIT	7500	7500	7500
Maximum calibrated brightness, NIT	6500	6500	6500
Refresh rate, Hz	600 - 32,000	600 - 32,000	600 - 32,000
Minimum viewing distance, m	14	16	20
Lifetime	> 100,000 hours (> 11.5 years 24/7)		
IP rating; operating temperature and humidity	Front: IP65, Rear: IP44; from -30 °C to +40 °C, humidity up to 100% (25 °C)		
Power supply (single phase voltage)	220 V +15% / -60%; 50 - 60 Hz		
Power supply (three phase voltage)*	380 V +10% / -15%; 50 Hz		
Power consumption, W/m ²	- average - maximum - with calibrated brightness 6,000 (5,000) NIT and T = 6,500°K	150 450 350	150 450 350
Module weight, kg	21	21	21
Display weight, kg/m ²	33	33	33

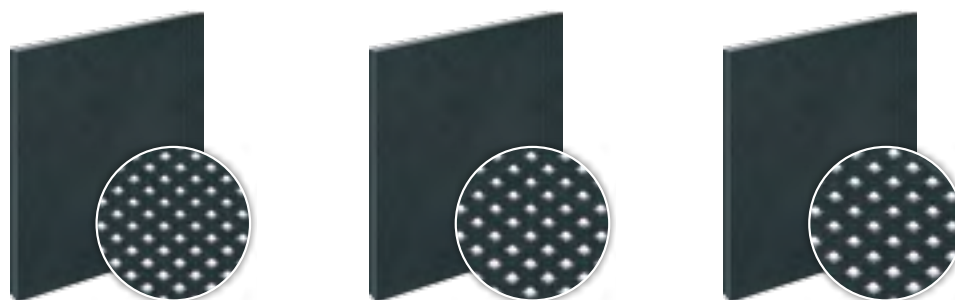


LVM 8C-E	LVM 10C-E	LVM 12C-E	LVM 16C-E	LVM 20C-E
LVM 8C-8S	LVM 10C-8S	LVM 12C-8S	LVM 16C-8S	LVM 20C-8S
Display sizes can vary as a multiple of module dimensions				
0.8 x 0.8 x 0.105				
96x96	80x80	64x64	48x48	40x40
14,400	10,000	6,400	3,600	2,500
8.33	10	12.5	16.67	20
1 (RGB: 3 in 1)				
SMD, 4,5x4,0 mm				
16				
up to 281 trillion (48 bit)				
150° 150°	150° 150°	150° 150°	150° 150°	150° 150°
5,000	5,000	5,000	5,000	5,000
7,200	7,200 - 32,000	7,200 - 32,000	600 - 32,000	600 - 32,000
6	8	10	14	17
> 100,000 hours (> 11.5 years 24/7)				
Front: IP65, Rear: IP44; from -20 °C to +40 °C, humidity up to 100% (25 °C)				
220 B +15% / -60%; 50 - 60 Hz				
380 B +10% / -15%; 50 Hz				
150 450 350	150 450 350	150 450 350	150 450 350	150 450 350
20	20	20	20	20
31	31	31	31	31

LED PRODUCTS

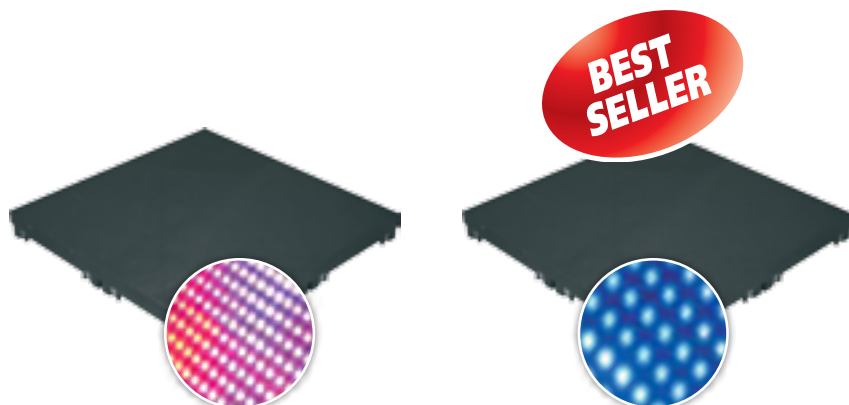
Blade LED

INDOOR



Model		iLVM 8C-E	iLVM 10C-E	iLVM 12C-E
Module type		iLVM 8C-8S	iLVM 10C-8S	iLVM 12C-8S
Display size		Display sizes can vary as a multiple of module dimensions		
Module dimensions, m		0.8 x 0.8 x 0.105		
Module resolution	- virtual pixels - real pixels	96x96	80x80	64x64
Pixel density, pixel/m ²		14,400	10,000	6,400
Pixel pitch, mm	- virtual - real	8.33	10	12.5
Number of LEDs in pixel		1 (RGB: 3 in 1)		
LED type		SMD, 3 mm		
Colour processing, bit		16		
Colours		up to 281 trillion (48 bit)		
Viewing angle	- horizontal - vertical	150° 150°	150° 150°	150° 1150°
Maximum brightness, NIT		-	-	-
Maximum calibrated brightness, NIT		3,500 (2,500)	3,500 (2,500)	3,500 (2,500)
Refresh rate, Hz		7,200	7,200	7,200
Minimum viewing distance, m		6	8	10
Lifetime		> 100,000 hours (> 11.5 years 24/7)		
Operating temperature		from 0 °C to +40 °C	from 0 °C to +40 °C	from 0 °C to +40 °C
Power supply (single phase voltage)		220 V +15% -60%; 50 - 60 Hz		
Power supply (three phase voltage)*		380 V +10% -15%; 50 Hz		
Power consumption, W/m ²	- average - maximum - with calibrated brightness 2,000 NIT and T = 6,500°K	200 (150) 600 (450) 420	200 (150) 600 (450) 420	200 (150) 600 (450) 420
Module weight, kg		19	19	19
Display weight, kg/m ²		30	30	30

WOW Floor



Model	iLVF 24C	iLVF 32C	
Module type	iLVF 24C	iLVF 32C	
Video floor size	Video floor size can vary as a multiple of module dimensions		
Module size, m	0.773 x 0.773 x 0.12		
Levelling	adjustable jack, up to 15 mm		
Real pixel pitch, mm	24.15	32.20	
Object detection pitch, mm	200/100/-	200/100/-	
Module resolution, pixel	32x32	24x24	
Number of LEDs in pixel	1 (RGB: 3 in 1)		
LED type	SMD, 5 mm		
Number of LEDs in module	1,024	576	
Colour processing, bit	16		
Colours	up to 281 trillion (48 bit)		
Viewing angle:	- horizontal - vertical	60° (180°) 60° (180°)	60° (180°) 60° (180°)
Maximum brightness, NIT	650	500	
Refresh rate, Hz	600 - 32,000	600 - 32,000	
Lifetime	> 100,000 hours (> 11.5 years 24/7)		
Protection and actual operating conditions	front - IP55; back - IP30; from 0° C to +40° C;		
Power supply (single phase voltage), Hz	220 V +15% -60%; 50 - 60 Hz		
Power supply (three phase voltage)*, Hz	380 V +10% -15%; 50 Hz		
Power consumption, W/m ²	350	270	
Module weight, kg	32		
Protective coating Decorative coating	Impact resistant laminate safety glass; Specification on request		

iLVM 1.9C-E

SUPER HIGH RESOLUTION DISPLAYS' ADVANTAGES

Common cathode system architecture defines high image quality at low brightness.

The newest ERMACplus control system gives the biggest display format at the smallest pixel pitch:

- Up to 4K resolution
- Up to 7,680 x 1,080 resolution

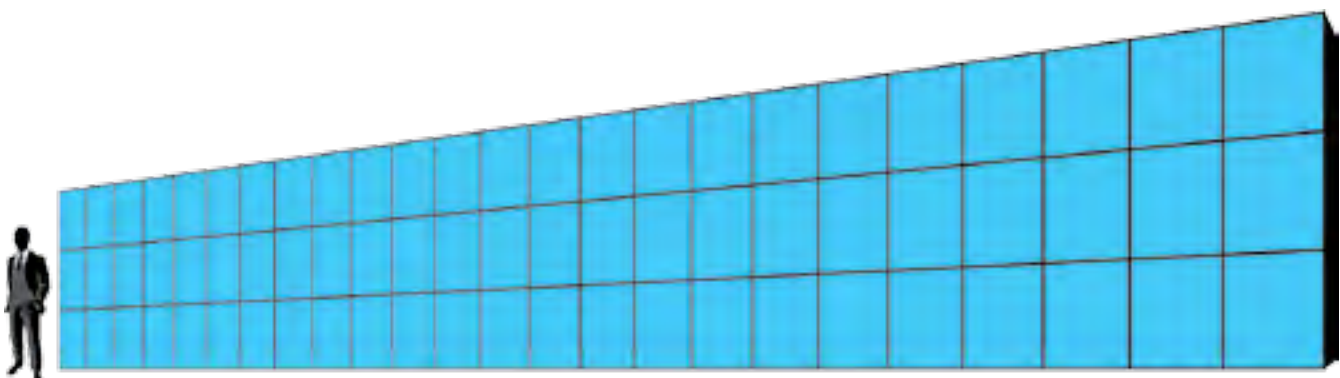
FEATURES:

- ▶ Advanced brightness at the smallest pixel pitch – 2,000 Nit
- ▶ Low power consumption and minimal heat output
- ▶ The highest illumination uniformity and color rendition

APPLICATIONS:

- ✓ Military and emergency service control rooms
- ✓ Digital signage
- ✓ Branding & retail shops
- ✓ Telecom
- ✓ Conference rooms
- ✓ Traffic management

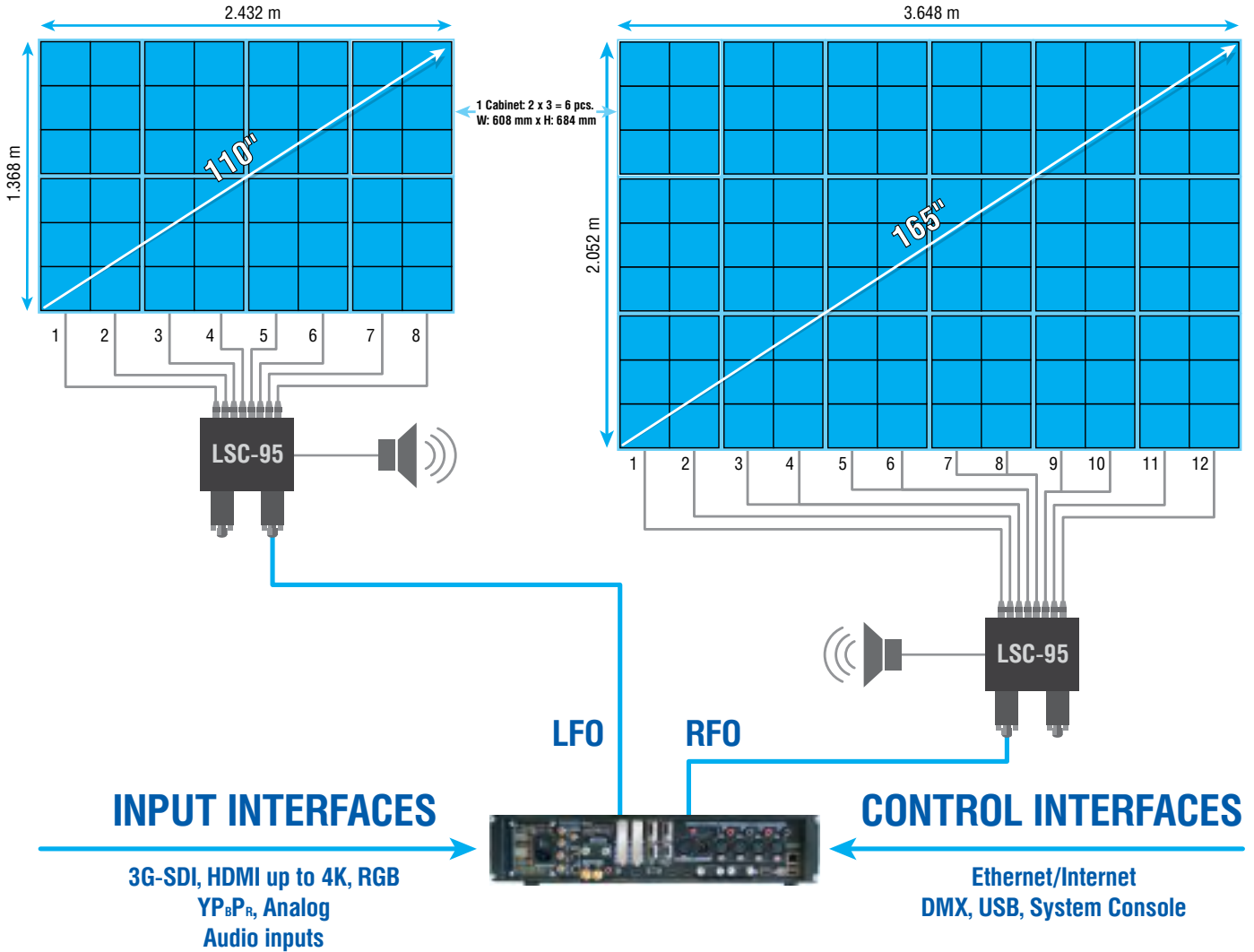
Model	iLVM 1.9C-E
Module type	iLVM 1.9C-6S
Module dimensions, m	0.608 x 0.684 x 0.06
Module resolution, pixels	320x360
Pixel density, pixel/m ²	277,008
Pixel pitch, mm	1.9
Number of LEDs in pixel	1 (RGB: 3 in 1)
LED type	SMD type, 1 mm
Colour processing, bit	16 bit
Colours	up to 281 trillion (48 bit)
Viewing angle	- horizontal - vertical
	150° 150°
Calibrated brightness, NIT	2,000
Refresh rate, Hz	1,920
Minimum viewing distance, m	1.0
Lifetime	100,000 hours
Operating temperature	from 0 °C to +40 °C
Module power supply	220 V +15% -60%; 50 - 60 Hz
Display power supply (three phase voltage)	380 V +10% -15%; 50 Hz
Power consumption with calibrated brightness 2,000 NIT	385 W/module / 930 W/m ²
Module weight, kg	13.5
Display weight, kg/m ²	32.5



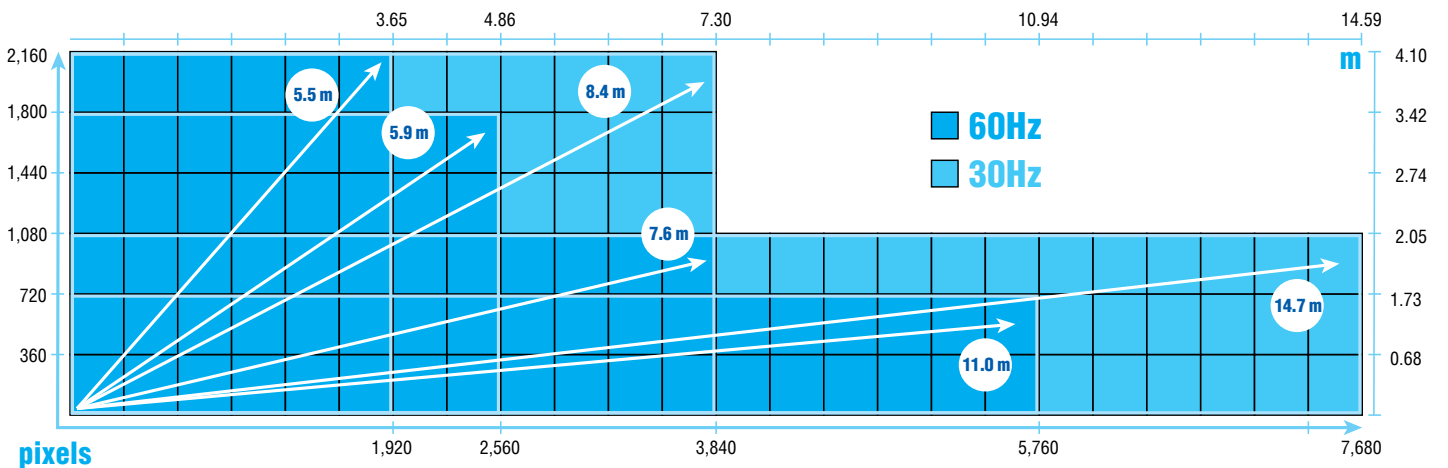
LED-SCREEN ARCHITECTURE

LED-screen 1,280 x 720 (pitch 1.9mm)

LED-screen 1,920 x 1,080 (pitch 1.9mm)



FORMATS:



CONTROL UNITS

ERMACPlus – SYSTEM



For the latest in control system flexibility for LED video display screens and other video equipment, EKTA's unique design ERMACPlus three-level architecture has revolutionised video processing technology for large-scale LED displays and visualisation equipment.

Combining six different products into a single state-of-the-art solution, the versatile design of ERMACPlus supports all current EKTA screen models, including FrameLED, BladeLED and WOWFloor product lines. Incorporated into the ERMACPlus unit, the new SPU-006 processor provides the ultimate solution for controlling EKTA's cutting edge screens – iLVM 4C-Qs (pp=4,0 mm, 18 bit processing, 120Hz), LVM 6C-Q (pp=6,9 mm, 18 bit processing, 120Hz, outdoor) and iLVM 1.9C-E (pp=1.9mm, 16 bit processing, 60Hz) as well as supporting complex video equipment.

SYSTEM LEVEL DEVICE – ERMACPlus / SPU-006

FEATURES

- ▶ Motherboard and four Add-In-Cards (AiC) 19" rack mounting case
- ▶ Five image channels (one motherboard (MB) & four AiC with flexible configurations of new HDMI, 3G SDI (Copper or on-board fibre input) and Display Port standards
- ▶ Five simultaneous image windows with fader and cross-fader between them
- ▶ 10 bit processing from 480i to 1080p and 4K resolution
- ▶ 18 bit processing for LED-to-LED uniformed corrections, screen brightness adjustment, gamma and colour temperature control
- ▶ Embedded Intel Atom Based Processor
- ▶ Five control interfaces - Integrate Console, System Console, DMX512, Ethernet and Internet WEB-Interface
- ▶ Up to 16 various pixel pitch LED screen devices or digital panels in the chain
- ▶ Two Fibre Optic (FO) and one HDMI outputs with frame rates of 30; 50; 60; 75; 100; 120 Hz
- ▶ 3D ready on board
- ▶ Feedback link for:
 - diagnostics module operating parameters (temperature, voltages and current);
 - reading LED parameter measurement tables for LED-to-LED colour calibrations;
 - reading luminous sensor value for automatic screen brightness control
- ▶ Audio IN/OUT and translate audio packets over Fibre Optic



INPUT	
MB Image Channel Input	DVI/HDMI or DisplayPort - up to 4K (297MHz Pixels Rate) 3G SDI - up to 1080p (Copper or fibre input switched, auto-configure for 3G-, HD- and SD-SDI)
MB Video Input for AiC (are processed by any AiC)	Composite video, 2xBNC Y/C, 2xMiniDin YPbPr 1xD-Connector 3G SDI - up to 1080p
AiC Video Input (for all AiC options)	Up to 4xDVI (HDMI connector)1920 x 1200 Up to 4xHDMI1080p* Up to 4xRGBwith pixel rates up to 150 MHz (included 1280x1024) Up to 4x3G SDI1080p (auto-configure for 3G-, HD- and SD-SDI)
Audio Input	2 stereo balanced inputs 2 stereo non-balanced inputs S/PDIF, 1 copper/fiber 3G SDI Any HDMI or DP input*
OUTPUT	
Digital Video Output	2x6.1 Gbit fiber optic (Left FO and Right FO), 30bpp display device chain output: - Pixel Rate152,5MHz (Clone FO Mode); 305MHz (Dual FO Mode) - Horizontal size max. (X):up to 8 192 pixels - Vertical size max. (Y):up to 4 096 pixels - X*Y size max.up to 5 000 000 pixels/60Hz (Dual FO, 2560x1600 included) DVI (HDMI connector) output,1920 x 1200 pixels DVI and Clone FO simultaneously1920 x 1200 pixels
Audio Output	S/PDIF, 1 copper/fiber HDMI Output* Audio Packets Translations over FO
PROCESSING	
Internal Processing	10/12 bit colour depth processing (except DVI); up/down scaler; de-interlacing; Windows manager; fader and cross-fader between image windows; system VS from Ex. GenLock, selected input or free-run; hardware auto-configuration (including screen chain); random LED display tile connection.
CONTROL	
Control Interface (selectable)	Integrate, System, Ethernet, Internet, DMX
Control Unit	Integrate, System Console, Desktop/laptop PC (Windows XP, 7, 8)
Configurable and Control Software	ESPanel, Screen Builder, drivers
DIAGNOSTICS	
FeedBack Display Monitoring	LED cluster temperature; module power supply values; LED module current; outside temperature; external luminance; project version, LED cluster manufacturing ID; etc.
GENERAL DESIGN	
Dimensions	19" Rack, face or reverse mounting case, height - 2RU, depth - 220 mm
Power	100-240 VAC, 50-60 Hz, 100 Watt
Hardware Configuration	Motherboard (MB) + 4 ADD-IN Cards (AiC) + AudioMixer Board 5 independent image channels (one at MB, four on the AiCs) Transformer De-coupling audio mixer DMX IN/OUT 2 x 6.1G full duplex fiber optic screen link, 30 bpp (bit per pixel) 165 MHz DVI (HDMI Connector) output
AiC Type	HDMI/3G SDI Picture Channel Slot (hsPCS) HDMI 4K Picture Channel Slot (hPCS) Standard Definition Video (eSDV) Random Configurations AiC in the SPU-006
Multiformat Image Channel and Output Windows	Up to 5 multi-input image channels Up to 5 simultaneous output windows 30 bit image layer Desktop colour settings
Screen Link	Up to 16 screen devices in the chain Variable-technology screen device types - LED, PDP, LCD, projector Distance between screen devices - 500 m tactical multi-mode fibre, 10 km single-mode fibre

Screen Level Devices ERMACPlus / LSC 08x, 09x (LED screen controllers) <ul style="list-style-type: none"> • Loop-Through FO 6.1GHz for Devices Chain Cascade • 16 RJ45 LVDS output ports (cat. 5e or cat.6 cable) • 12.5-15MHz (cable depended) Pixel Rate for each port • 240MHz Total Pixel Rate • Horizontal Size max. 4096 Pixel • Vertical Size max. 4096 Pixel • Processing Ping-Pong picture buffered, frame clipper, block (cabinet) connected, audio processing 	Module (Cabinet) Level Devices ERMACPlus / LBRD 02x (LED Block Refresh and Diagnostic) ERMACPlus / LTCP (LED Tile Control Processing) <ul style="list-style-type: none"> • Loop-Through LVDS input port for Devices Cascade • Up to 128 Device in chain for one LSC port • FPGA based design for flexible customization
Device availability <ul style="list-style-type: none"> • Input port Two RJ45 (indoor), IP67 Connector (outdoor) • Output port TTL round cable (4 port), TTL Wago Terminal (4 port), LVDS Flat Cable (up to 10 port), TTL Direct Connect (6 port, BackPlane Variant) 	

* HDCP licence – optional

CONTROL UNITS

ERMAC – SYSTEM



ERMAC three-level software architecture has revolutionised video processing technology for large-scale LED displays and visualisation equipment, combining six different products into a single state-of-the-art solution.

Its versatile design supports all current EKTA screen models, including FrameLED, BladeLED and WOWFloor product lines. The new SPU-005 processor provides the ultimate solution for controlling EKTA's cutting edge iLVM 4C, iLVM 6C (16 bit processing) and iLVM 4C-Q (18 bit processing) LED video displays.

SYSTEM LEVEL DEVICE – ERMAC / SPU-005

FEATURES

- ▶ Motherboard and four Add-In-Cards (AiC) 19" rack mounting case
- ▶ Five image channels (one motherboard (MB) & four AiC with flexible configurations of new HDMI, 3G SDI standards)
- ▶ Five simultaneous image windows with fader and cross-fader between them
- ▶ True HD – 10 Bit processing from 480i to 1080p
- ▶ 18 bit processing for LED corrections, screen brightness adjustment, gamma and colour temperature control
- ▶ Three control interfaces - USB-2.0, Ethernet (UDP) and stand-alone (embedded ARM9)
- ▶ Up to 16 various pixel pitch LED screen devices or digital panels in the chain
- ▶ Two Fibre Optic (FO) and one HDMI outputs with frame rates of 50; 60; 75; 100; 120 Hz
- ▶ 3D ready (optional)
- ▶ Feedback link for: diagnostics module operating parameters (temperature, voltages and current); reading LED parameter measurement for LED-to-LED colour calibrations; reading luminous sensor value for automatic screen brightness control
- ▶ Audio IN/OUT and translate audio packets over Fibre Optic
- ▶ On-board TFT control monitor with touch screen (frame image and ARM9 share)

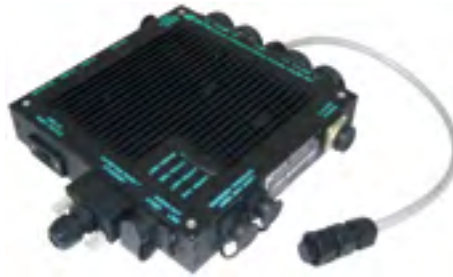


INPUT			
MB Image Channel Input	DVI (HDMI connector) – 1920 x 1200 pixels HDMI 1080p* RGB 1280 x 1024 YPbPr 1080p		
MB Video Input for AiC (are processed by any AiC)	Composite video, 4xBNC Y/C, 2xMiniDin HD SDI, 2xBNC (switched), auto-configuration for HD-SDI, SD-SDI		
AiC Video Input (for all AiC options)	Up to 4xDVI (HDMI connector) . . . 1920 x 1200 pixels Up to 4xHDMI. 1080p* Up to 4xRGB. with pixel rates up to 150 MHz (included 1280x1024) Up to 4xYPbPr. 1080p Up to 4x3G SDI 1080p (auto-configure for 3G-, HD- and SD-SDI)		
Audio Input	2 stereo balanced inputs 2 stereo non-balanced inputs S/PDIF, 1 copper or fibre SDI Any HDMI input*		
OUTPUT			
Digital Video Output	2x2.5 Gbit fibre optic (FO) 8/10 bit screen device chain output: - Horizontal size (X): 800 – 4096 pixels, 10240 pixels (optional) - Vertical size (Y): 272 – 2048 pixels - X*Y size max. 2 446 000 pixels (Dual FO) DVI (HDMI connector) output, 1920 x 1200 pixels DVI and Dual FO simultaneously 1920 x 1200 pixels		
Audio Output	S/PDIF, 1 copper or fibre		
PROCESSING			
Internal Processing	10/12 bit colour depth processing (except DVI); up/down scaler; de-interlacing; Windows manager; fader and cross-fader between image windows; system VS from Ex. GenLock, selected input or free-run; hardware auto-configuration (including screen chain); random LED display tile connection.		
CONTROL			
Control Interface (selectable)	Ethernet, USB 2.0, Integrate (embedded ARM-9 processor), DMX		
Control Unit	Desktop/laptop PC (Windows XP, Windows Vista, Windows 7), IP, embedded ARM-9		
Configurable and Control Software	ESPanel, Screen Builder, drivers		
DIAGNOSTICS			
FeedBack Screen Monitoring	LED cluster temperature; module power supply values; LED module current; outside temperature; external luminance; project version, LED cluster manufacturing ID; etc.		
GENERAL DESIGN			
Dimensions	19" Rack, face or reverse mounting case, height – 2RU, depth – 220 mm		
Power	100-240 VAC, 50-60 Hz, 90 Watt		
Hardware Configuration	Motherboard (MB) + 4 ADD-IN Cards (AiC) + AudioMixer Board 5 independent image channels (one at MB, four on the AiCs) Transformer De-coupling audio mixer DMX IN/OUT 2 x 2.5G full duplex fibre optic screen link (selectable 24/30 bit/pixel) 165 MHz DVI (HDMI Connector) output		
AiC Type	HDMI/3G SDI Picture Channel Slot (hsPCS) Standard Definition Video (eSDV) Random Configurations AiC in the SPU-005		
Multiformat Image Channel and Output Windows	Up to 5 multi-input image channels Up to 5 simultaneous output windows 30 bit image layer Desktop colour settings		
Screen Link	Up to 16 screen devices in the chain Variable-technology screen device types – LED, PDP, LCD Distance between screen devices – 500 m tactical multi-mode fibre, 10 km single-mode fibre		
<table border="0"> <tr> <td style="vertical-align: top;"> Screen Level Devices ERMAC / LSC 080 (LED screen controller) <ul style="list-style-type: none"> • Loop-Through FO 2.5GHz for Devices Chain Cascade • 16 LVDS output ports (cat. 5e or cat.6 cable) with IP67 Connectors • 2.3-2.8 MHz (cable depended) Pixel Rate for each port • 45 MHz Total Pixel Rate • Horizontal Size max. 4096 Pixel • Vertical Size max. 2048 Pixel • Processing Ping-Pong picture buffered, frame clipper, module (cabinet) connected, audio processing </td> <td style="vertical-align: top;"> Module (Cabinet) Level Devices ERMAC / LBRD 02x (LED Block Refresh and Diagnostic) <ul style="list-style-type: none"> • Loop-Through LVDS input port for Devices Cascade • Up to 128 Modules in chain for one LSC port • FPGA based design for flexible customization Device availability <ul style="list-style-type: none"> • Input port IP67 Connector • Output port TTL round cable (4 port), TTL Wago Terminal (4 port), LVDS Flat Cable (up to 10 port) </td> </tr> </table>		Screen Level Devices ERMAC / LSC 080 (LED screen controller) <ul style="list-style-type: none"> • Loop-Through FO 2.5GHz for Devices Chain Cascade • 16 LVDS output ports (cat. 5e or cat.6 cable) with IP67 Connectors • 2.3-2.8 MHz (cable depended) Pixel Rate for each port • 45 MHz Total Pixel Rate • Horizontal Size max. 4096 Pixel • Vertical Size max. 2048 Pixel • Processing Ping-Pong picture buffered, frame clipper, module (cabinet) connected, audio processing 	Module (Cabinet) Level Devices ERMAC / LBRD 02x (LED Block Refresh and Diagnostic) <ul style="list-style-type: none"> • Loop-Through LVDS input port for Devices Cascade • Up to 128 Modules in chain for one LSC port • FPGA based design for flexible customization Device availability <ul style="list-style-type: none"> • Input port IP67 Connector • Output port TTL round cable (4 port), TTL Wago Terminal (4 port), LVDS Flat Cable (up to 10 port)
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* HDCP licence – optional

CONTROL UNITS

ceLSC-081



ceLSC-081 has been developed for creating video nets on the basis of all EKTA LED video display products, including FrameLED, BladeLED and WOWFloor product lines. Application spheres are digital signage, sports, transport systems etc.

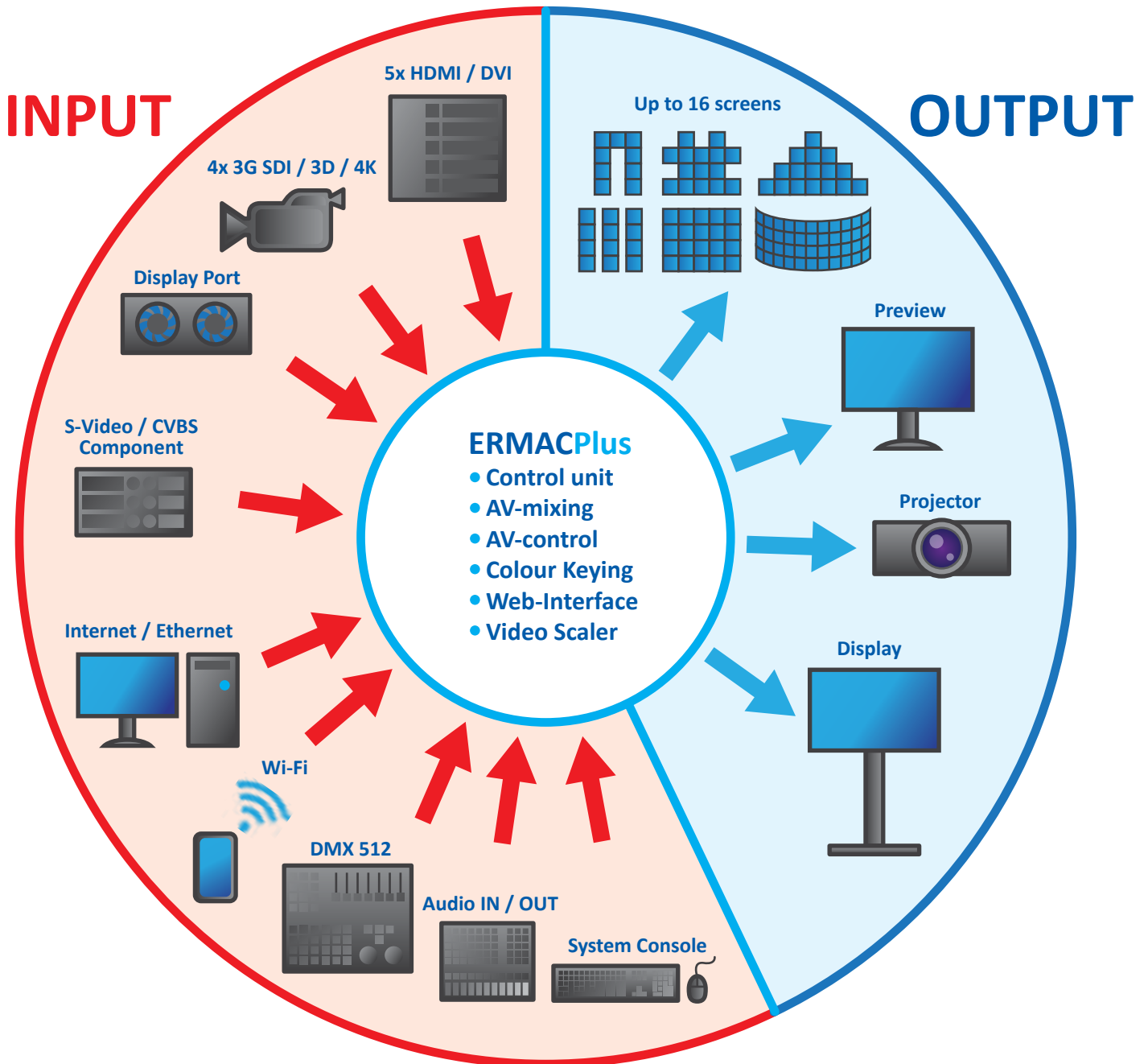
FEATURES

- ▶ Is created as a separate unit connected to EKTA LED screens modules
- ▶ Embedded Intel Atom based industrial processor
- ▶ 16 bit processing for LED corrections, screen brightness adjustment, gamma and colour temperature control
- ▶ Three control interfaces – ethernet and internet WEB-interface, service system console
- ▶ 8 bit processing up to 768p
- ▶ Frame rate – 60 Hz
- ▶ Feedback link for: diagnostics module operating parameters (temperature, voltages and current); reading luminous sensor value for automatic screen brightness control
- ▶ Audio OUTs: S/PDIF, Line

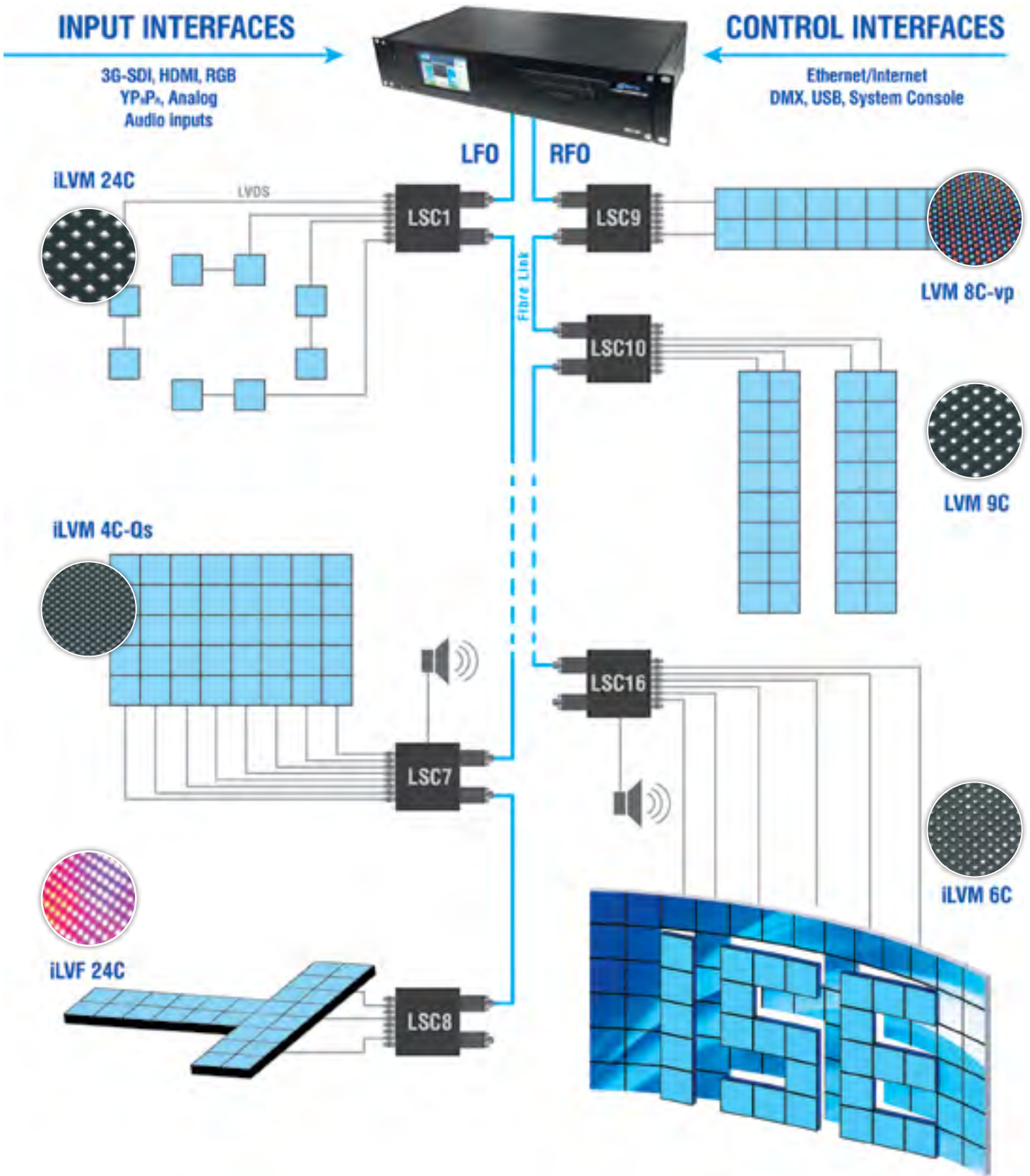
Embedded industrial PC	
	Atom 1.66 GHz, 1 GB DDR2 533 MHz, 4 GB SSD, Intel® GMA 500, HDTV/HD capable, Decoder for MPEG2 / HD / H.264
INPUT	
USB	3 x USB 2.0 (1 channel configurable as client)
Ethernet	10/100/1000 Mbit LAN
SD card	micro SD slot
OUTPUT	
Ekta Video Interface	8 LVDS output ports (cat. 5e) with IP67 Connectors, 2.8 MHz pixel rate for each port Frame rate - 60 Hz, 22.5 MHz Total Pixel Rate Horizontal Size max. 1024 Pixel Vertical Size max. 768 Pixel
Audio Output	S/PDIF, Line
PROCESSING	
Inside Processing	8 bit processing up to 768p
CONTROL	
Control Interface	Ethernet and internet WEB-interface, service system console
Control Unit	System Console, Desktop/laptop PC (Windows XP, 7, 8)
Control Software	Windows 7 Embedded ESPanel, drivers
DIAGNOSTICS	
Feedback Display Monitoring	LED cluster temperature; module power supply values; LED module current; outside temperature; outside luminance; project version, LED cluster manufacturing ID etc.
GENERAL DESIGN	
Dimensions	170 x 170 x 25 mm
Power	12 VDC, 30 Watt
Operating temperature	-25° to 60° C



Processor ERMACPlus Environment



Processor / controller ERMAC Applications



FRONT MAINTENANCE



Front maintenance system



Easy and quick access to all connections



Fast service & basic adjustment possibilities



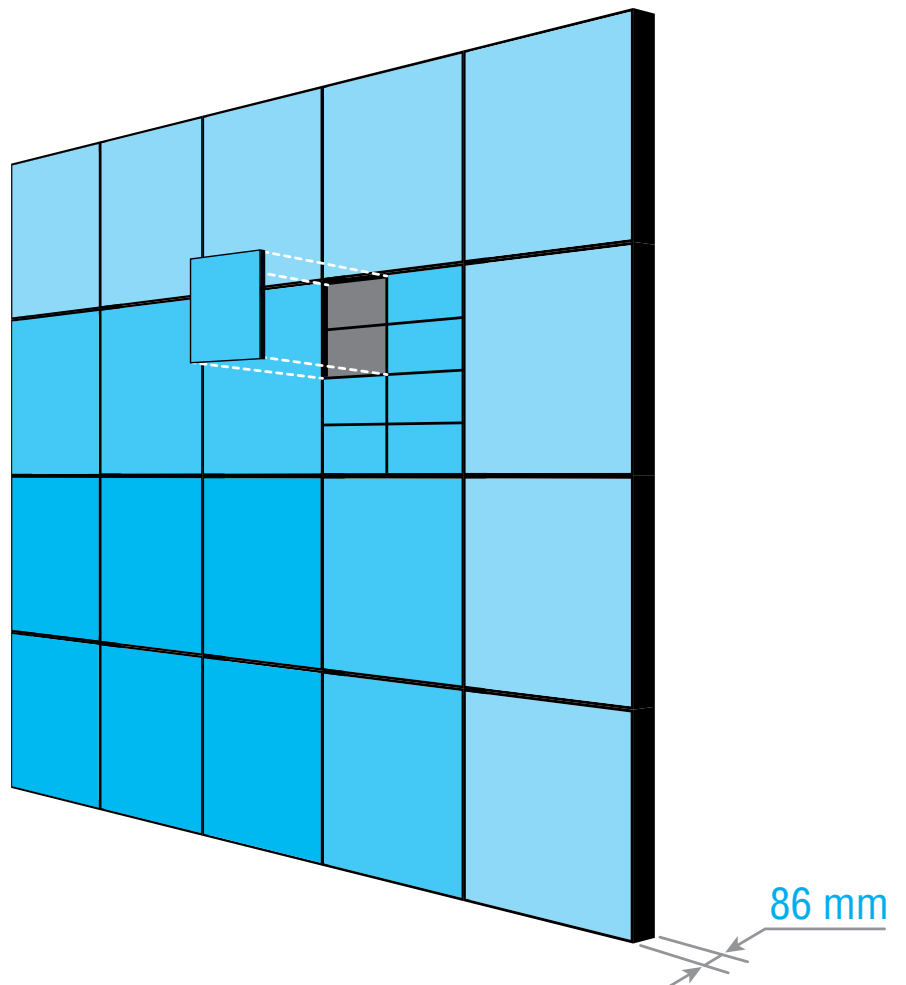
Needs very small space behind for structure, cables and ventilation



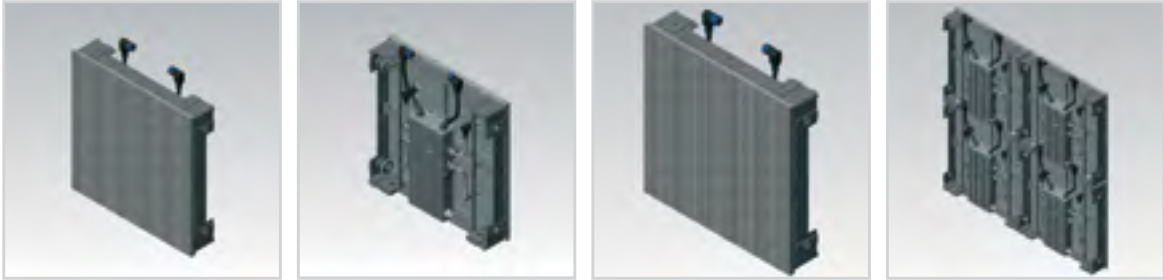
Slim module



Light weight



TOOL FREE MODULES*



RENTAL 1

RENTAL 4

EXTREMELY QUICK AND EASY ASSEMBLY

The new Frame series was specifically designed to meet the demanding requirements of rental business



Quick assembly/removal without any tools



Quick-detach clamps



Endless design possibilities



Light module



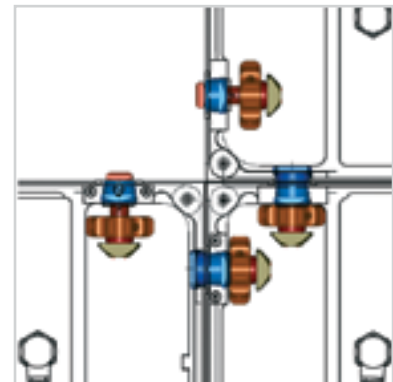
Ultrathin module



Sturdy aluminium frames



No need for additional cooling, silent operation

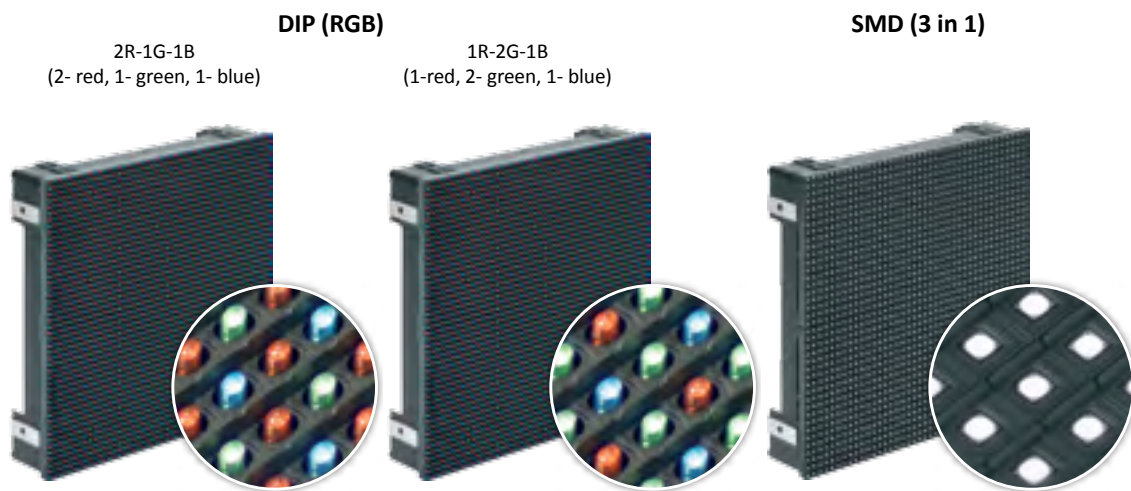


* Only for FrameLED series

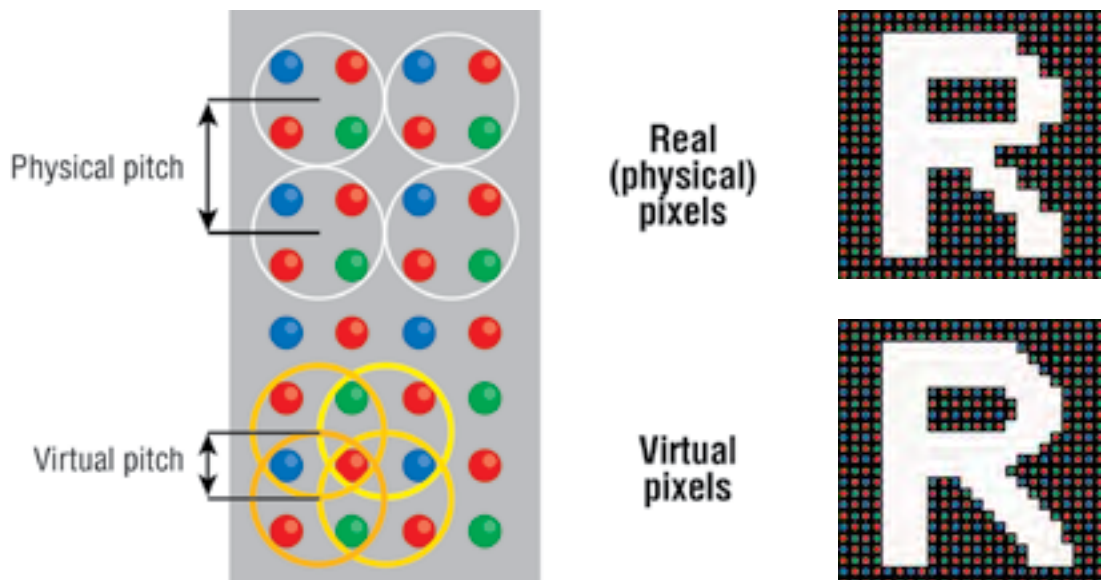
LED DISPLAY FEATURES

WHAT IS A PIXEL?

Pixel - is a physical colour point. The combination of many pixels makes an image. The pixel is the core component of raster images.

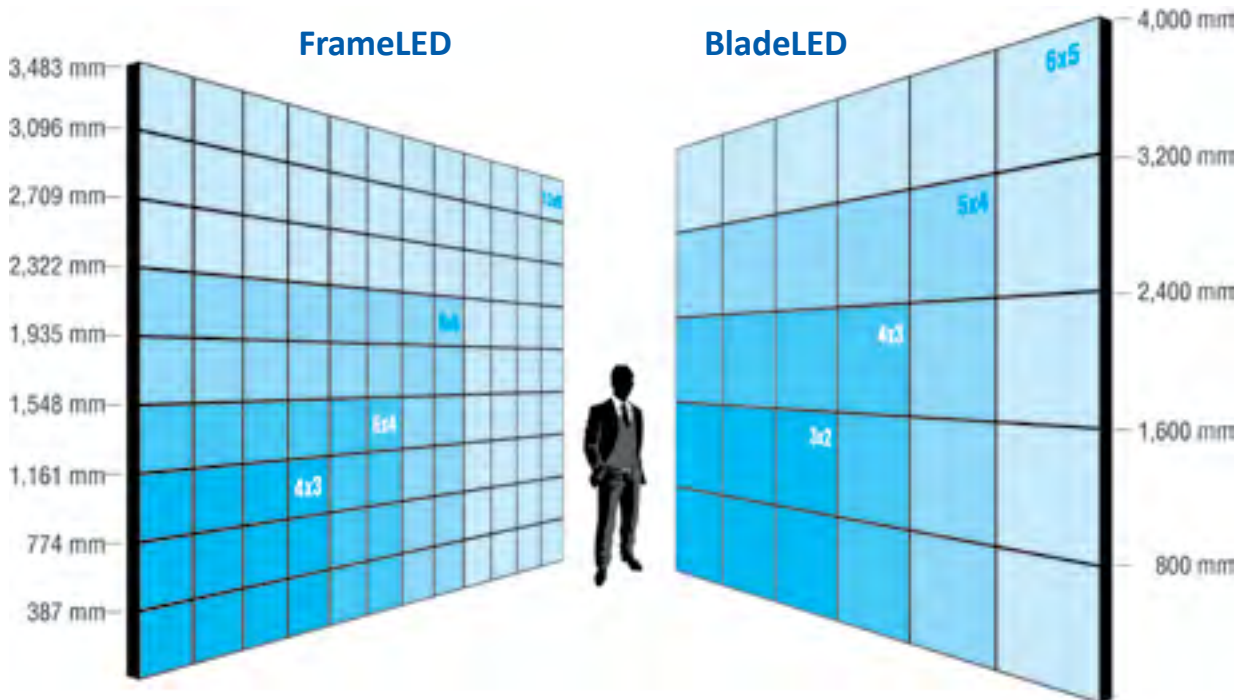


HOW IS THE REAL/PHYSICAL PIXEL IS FORMED?

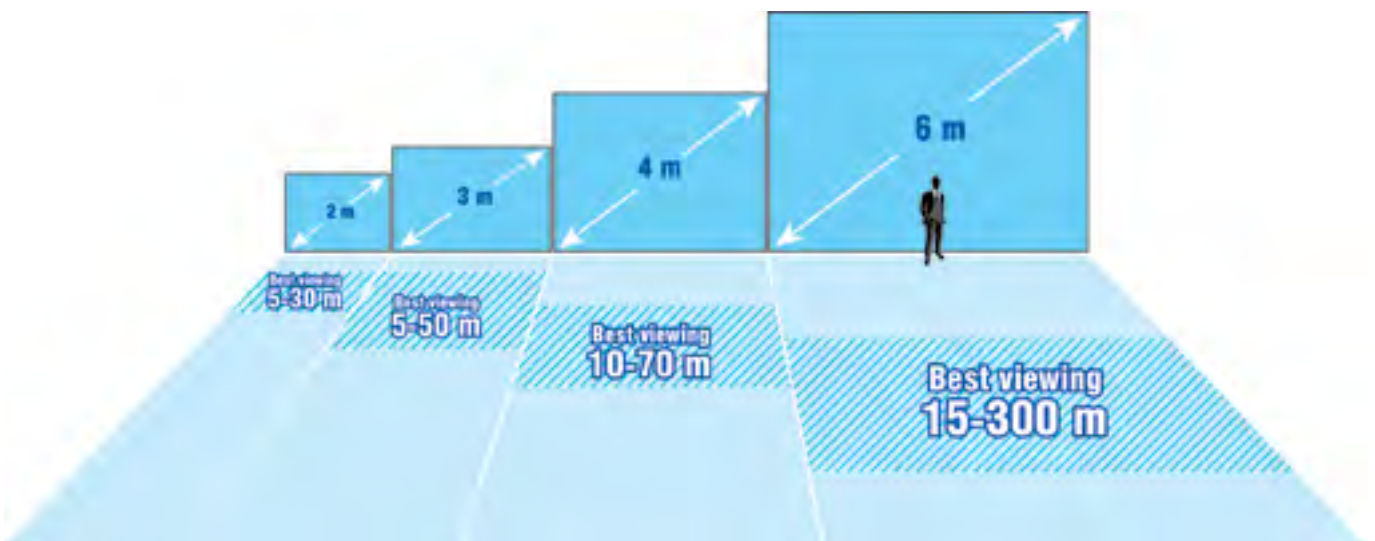


WHAT IS THE BEST WAY TO CHOOSE AN LED SCREEN?

LED screen sizes are defined purely by minimum viewing distance. The bigger the screen size, the bigger the viewing distance should be.



WHAT IS THE IDEAL SCREEN SIZE FOR A PARTICULAR VIEWING DISTANCE?*



* The scheme shows approximate figures. For each application the following should be considered:
 - real pixel pitch
 - the area around the screen

WHAT IS THE BEST WAY TO CHOOSE THE REAL PIXEL PITCH OF THE SCREEN?

The quality of an LED screen image is dependent on this characteristic. The lower the pixel pitch is (the closer to each other the LEDs are located), the shorter the viewing distance required for the image to be integrated, and vice versa.



Pixel pitch 4 mm



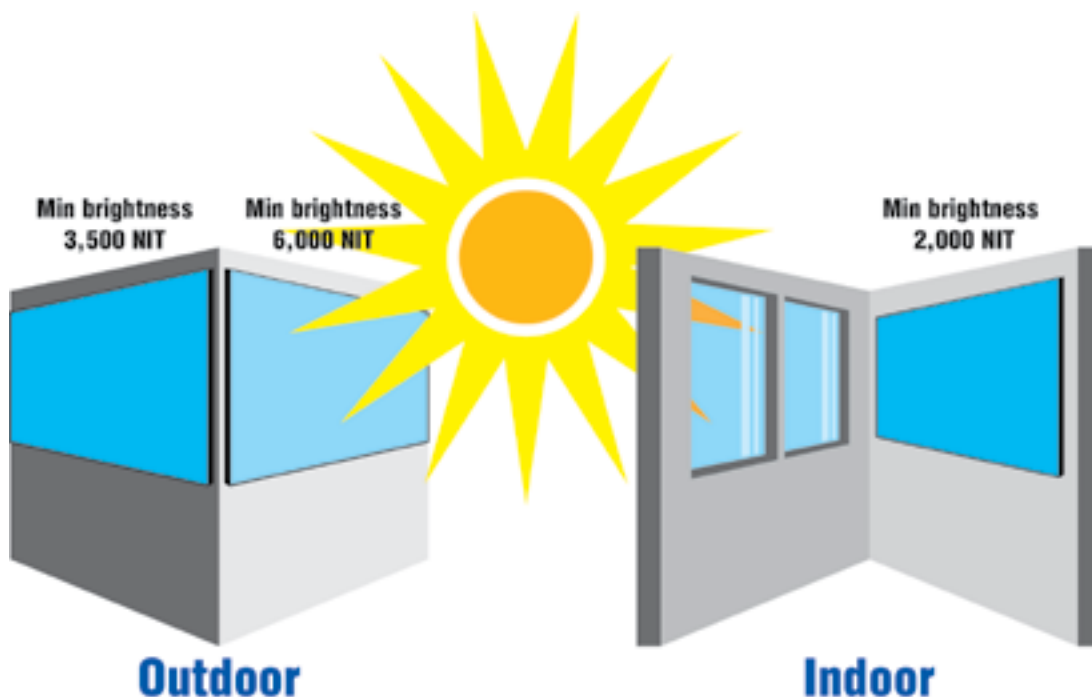
Pixel pitch 8 mm



Pixel pitch 16 mm

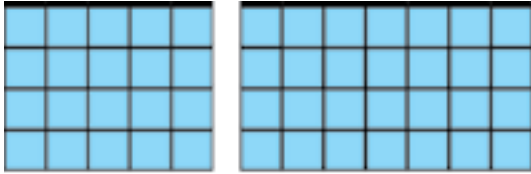
WHAT IS THE CORRECT BRIGHTNESS OF AN LED SCREEN?

This characteristic defines the image contrast on the screen.

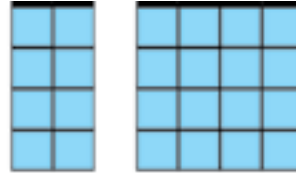


RANGE OF DISPLAY SURFACES

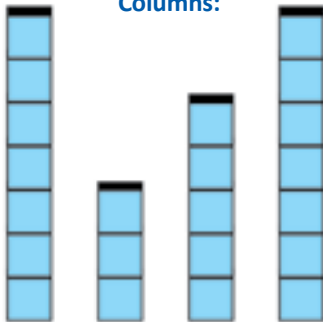
Standard formats (4:3, 16:9):



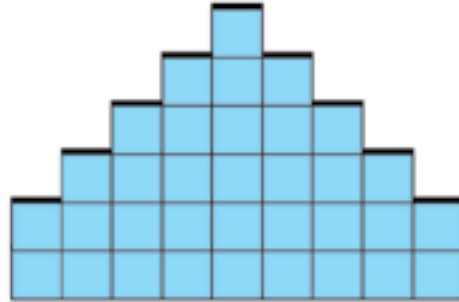
Non-standard formats



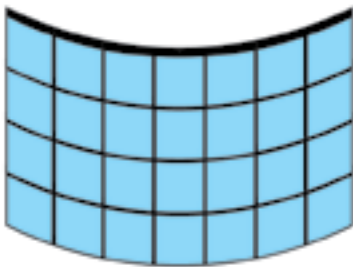
Columns:



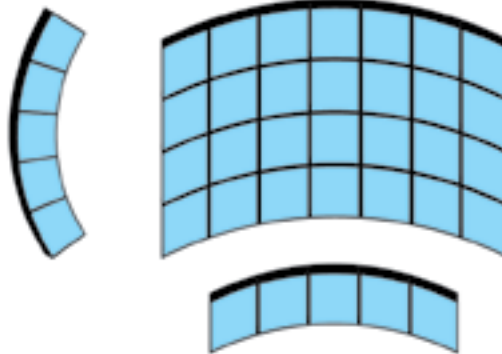
Pyramids:



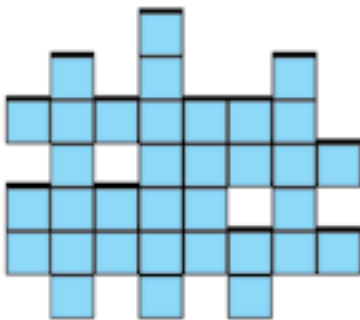
Convex:



Concave:



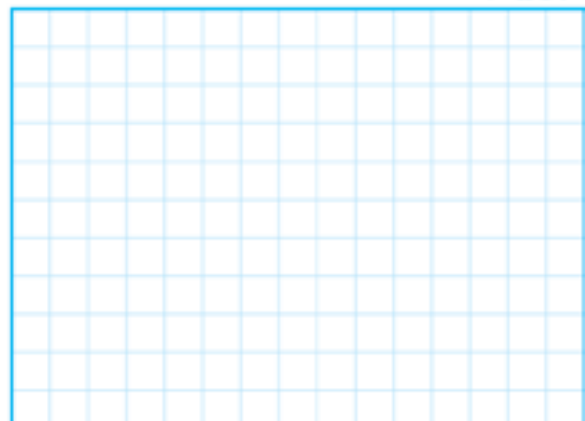
Ragged edges, holes:



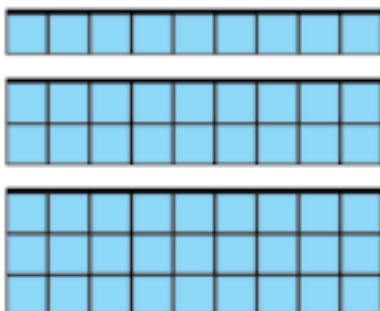
Individual modules:



Your idea:



Video lines:



EKTA ADVANTAGES

1. R&D, MANUFACTURING

OVER 30 YEARS IN R&D

EKTA has more than 30 years of engineering experience of research and development in the field of large-scale modular video systems. Following the innovative strategy EKTA today has a major influence on the field of AV technologies.

engineering **displays**
development
Over *innovative*
30 **LED**
research **Years**
art of performance
R&D *modular video systems*

UP-TO-DATE MANUFACTURING FACILITIES

EKTA products are manufactured at the high-tech plant located in Europe.

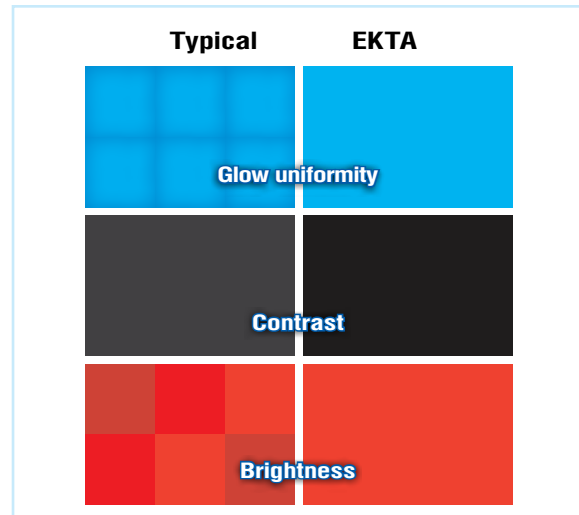
Production process is based on the highly precise state-of-the-art equipment from the world leading manufacturers.



2. UP-TO-DATE TECHNOLOGIES

IDEAL BRIGHTNESS, ILLUMINATION UNIFORMITY AND COLOUR RENDITION

- Exclusive Uniformity² two-level brightness calibration system ensures up to 99% illumination uniformity of EKTA screen video field
- EKTA video screens display up to 281 billion colours thanks to the 48 or 54-bit pixel colour management system
- The maximum calibrated brightness of EKTA videoscreens is up to 10,500 NIT for outdoor models and up to 6,000 NIT for indoor models
- Operation at low brightness values with no loss in colour quality
- All the adjustments in real time mode



A BROAD RANGE OF COLOUR TEMPERATURE ADJUSTMENT

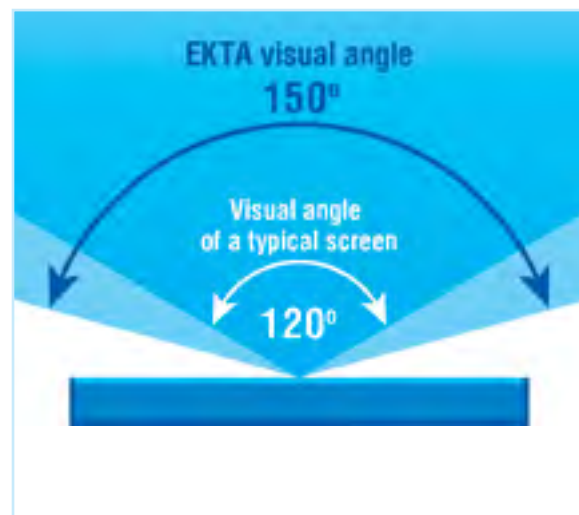
EKTA control systems allow smooth colour temperature adjustment from 2,000 up to 10,000 K with the help of a simple user interface.

It is really important when adjusting the screen to set the exact colour temperature for the appropriate ambient lighting: natural, artificial and studio lighting.



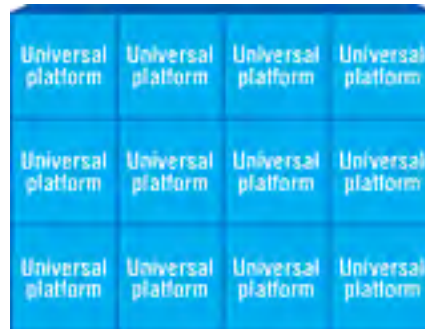
A WIDE VIEWING ANGLE FOR INDOOR SCREENS

The front louvre of our indoor screens ensures a maximum viewing angle of 150 degrees.



UNIVERSAL PLATFORM FOR ALL MODELS

- All models of the series – one frame
- All models of the series – one power supply unit
- All models – one control system
- Lightweight frame display module enables quick and easy screen assembly/removal. At the same time it forms a robust and tough video screen frame.



EASE OF USE

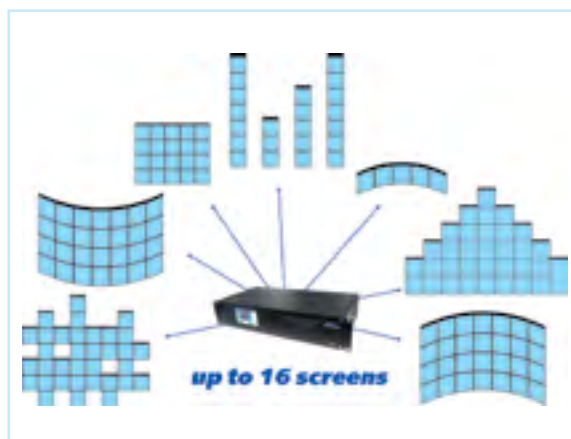
Module replacement (if required) is easy thanks to hot-swap maintenance and fast access to its settings and controls via the screen's controller.



3. CONTROLLABILITY

POWERFUL PROCESSOR/CONTROLLER

Up to 16 screens of different types and sizes, controlled individually through a single interface.



USER-FRIENDLY SOFTWARE

EKTA software provides a wide range of functional, integrated and multimedia possibilities for experts in visual media.



REMOTE CONTROL AND SCREEN OPERATION MONITORING

Feedback and diagnostic systems ensure remote control of screen performance, including visual control using a video camera and management of its settings from anywhere in the world.



4. RELIABILITY BASED ON SPACE TECHNOLOGIES

MAXIMUM RELIABILITY, LONG-TERM OPERATION

All EKTA products have industrial performance and can deliver continuous and non-failure operation not less than 100,000 hrs in 24/7 mode (equivalent to more than 11 years).



MAXIMUM ENVIRONMENTAL PROTECTION

- IP65 protection level*
- Temperature range from -30 to +40° C
- Humidity up to 100% (25° C)



* For outdoor models

5. QUALITY

HIGH QUALITY COMPONENTS

We only use LEDs and other components and materials of the highest quality from world-leading manufacturers, such as Nichia diodes.



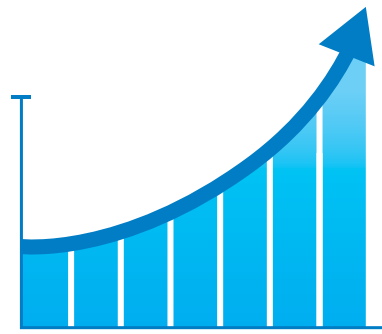
QUALITY CERTIFICATION

Quality management system is certified according to the international standard ISO 9001:2008.



TOTAL QUALITY MANAGEMENT

EKTA internal processes are organized according to the principles of TQM. This helps to increase work efficiency, products quality and as a result – customer satisfaction, which affects products competitive ability and sales prospects.

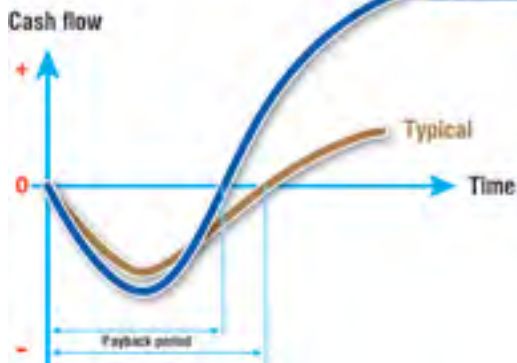


6. ECONOMIC ADVANTAGES



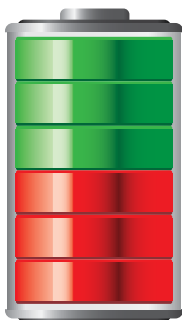
LOW TCO (TOTAL COST OF OWNERSHIP)

- Long-life operation
- High safety level
- High quality for low through-life maintenance
- Efficient performance
- Power saving performance



HIGH ROI (RETURN ON INVESTMENTS)

- Moderate initial cost
 - Record-breaking operational period
 - Low TCO of EKTA video screens
- ensure high ROI figures and the minimum payback period of the investment project.



**UPTO 50%
ECONOMY**

LOW POWER CONSUMPTION

THANKS TO:

- power supply units of high efficiency
- modules' unique circuit technique
- control system architecture
- high quality diodes used

TABLE OF SCREEN GEOMETRICAL SIZES AND SQUARES

FrameLED

16:9	NUMBER OF MODULES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	m	0.387	0.774	1.161	1.548	1.935	2.322	2.709	3.096	3.483	3.870	4.257	4.644	5.031	5.418	5.805	6.192	6.579
1	0.387	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55
2	0.774	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.30	3.60	3.90	4.20	4.50	4.80	5.10
3	1.161	0.45	0.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50	4.95	5.40	5.85	6.30	6.75	7.20	7.65
4	1.548	0.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00	6.60	7.20	7.80	8.40	9.00	9.60	10.20
5	1.935	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00	9.75	10.50	11.25	12.00	12.75
6	2.322	0.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20	8.10	9.00	9.90	10.80	11.70	12.60	13.50	14.40	15.30
7	2.709	1.05	2.10	3.15	4.20	5.25	6.30	7.35	8.40	9.45	10.50	11.55	12.60	13.65	14.70	15.75	16.80	17.85
8	3.096	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60	10.80	12.00	13.20	14.40	15.60	16.80	18.00	19.20	20.40
9	3.483	1.35	2.70	4.05	5.40	6.75	8.10	9.45	10.80	12.15	13.50	14.85	16.20	17.55	18.90	20.25	21.60	22.95
10	3.870	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00	13.50	15.00	16.50	18.00	19.50	21.00	22.50	24.00	25.50
11	4.257	1.65	3.30	4.95	6.60	8.25	9.90	11.55	13.20	14.85	16.50	18.15	19.80	21.45	23.10	24.75	26.40	28.05
12	4.644	1.80	3.60	5.40	7.20	9.00	10.80	12.60	14.40	16.20	18.00	19.80	21.60	23.40	25.20	27.00	28.80	30.60
13	5.031	1.95	3.90	5.85	7.80	9.75	11.70	13.65	15.60	17.55	19.50	21.45	23.40	25.35	27.30	29.25	31.20	33.15
14	5.418	2.10	4.20	6.30	8.40	10.50	12.60	14.70	16.80	18.90	21.00	23.10	25.20	27.30	29.40	31.50	33.60	35.70
15	5.805	2.25	4.50	6.75	9.00	11.25	13.50	15.75	18.00	20.25	22.50	24.75	27.00	29.25	31.50	33.75	36.00	38.25
16	6.192	2.40	4.80	7.20	9.60	12.00	14.40	16.80	19.20	21.60	24.00	26.40	28.80	31.20	33.60	36.00	38.40	40.80
17	6.579	2.55	5.10	7.65	10.20	12.75	15.30	17.85	20.40	22.95	25.50	28.05	30.60	33.15	35.70	38.25	40.80	43.35
18	6.966	2.70	5.40	8.10	10.80	13.50	16.20	18.90	21.60	24.30	27.00	29.70	32.40	35.10	37.80	40.50	43.20	45.90
19	7.353	2.85	5.70	8.55	11.40	14.25	17.10	19.95	22.80	25.65	28.50	31.35	34.20	37.05	39.90	42.75	45.60	48.45
20	7.740	3.00	6.00	9.00	12.00	15.00	18.00	21.00	24.00	27.00	30.00	33.00	36.00	39.00	42.00	45.00	48.00	51.00

ASPECT RATIO 16:9

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
6.966	7.353	7.740	8.127	8.514	8.901	9.288	9.675	10.062	10.449	10.836	11.223	11.610	11.997	12.384	12.771	13.158	13.545	13.932
2.70	2.85	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	4.50	4.65	4.80	4.95	5.10	5.25	5.40
5.40	5.70	6.00	6.30	6.60	6.90	7.20	7.50	7.80	8.10	8.40	8.70	9.00	9.30	9.60	9.90	10.20	10.50	10.80
8.10	8.55	9.00	9.45	9.90	10.35	10.80	11.25	11.70	12.15	12.60	13.05	13.50	13.95	14.40	14.85	15.30	15.75	16.20
10.80	11.40	12.00	12.60	13.20	13.80	14.40	15.00	15.60	16.20	16.80	17.40	18.00	18.60	19.20	19.80	20.40	21.00	21.60
13.50	14.25	15.00	15.75	16.50	17.25	18.00	18.75	19.50	20.25	21.00	21.75	22.50	23.25	24.00	24.75	25.50	26.25	27.00
16.20	17.10	18.00	18.90	19.80	20.70	21.60	22.50	23.40	24.30	25.20	26.10	27.00	27.90	28.80	29.70	30.60	31.50	32.40
18.90	19.95	21.00	22.05	23.10	24.15	25.20	26.25	27.30	28.35	29.40	30.45	31.50	32.55	33.60	34.65	35.70	36.75	37.80
21.60	22.80	24.00	25.20	26.40	27.60	28.80	30.00	31.20	32.40	33.60	34.80	36.00	37.20	38.40	39.60	40.80	42.00	43.20
24.30	25.65	27.00	28.35	29.70	31.05	32.40	33.75	35.10	36.45	37.80	39.15	40.50	41.85	43.20	44.55	45.90	47.25	48.60
27.00	28.50	30.00	31.50	33.00	34.50	36.00	37.50	39.00	40.50	42.00	43.50	45.00	46.50	48.00	49.50	51.00	52.50	54.00
29.70	31.35	33.00	34.65	36.30	37.95	39.60	41.25	42.90	44.55	46.20	47.85	49.50	51.15	52.80	54.45	56.10	57.75	59.40
32.40	34.20	36.00	37.80	39.60	41.40	43.20	45.00	46.80	48.60	50.40	52.20	54.00	55.80	57.60	59.40	61.20	63.00	64.80
35.10	37.05	39.00	40.95	42.90	44.85	46.80	48.75	50.70	52.65	54.60	56.55	58.50	60.45	62.40	64.35	66.30	68.25	70.20
37.80	39.90	42.00	44.10	46.20	48.30	50.40	52.50	54.60	56.70	58.80	60.90	63.00	65.10	67.20	69.30	71.40	73.50	75.60
40.50	42.75	45.00	47.25	49.50	51.75	54.00	56.25	58.50	60.75	63.00	65.25	67.50	69.75	72.00	74.25	76.50	78.75	81.00
43.20	45.60	48.00	50.40	52.80	55.20	57.60	60.00	62.40	64.80	67.20	69.60	72.00	74.40	76.80	79.20	81.60	84.00	86.40
45.90	48.45	51.00	53.55	56.10	58.65	61.20	63.75	66.30	68.85	71.40	73.95	76.50	79.05	81.60	84.15	86.70	89.25	91.80
48.60	51.30	54.00	56.70	59.40	62.10	64.80	67.50	70.20	72.90	75.60	78.30	81.00	83.70	86.40	89.10	91.80	94.50	97.20
51.30	54.15	57.00	59.85	62.70	65.55	68.40	71.25	74.10	76.95	79.80	82.65	85.50	88.35	91.20	94.05	96.90	99.75	102.60
54.00	57.00	60.00	63.00	66.00	69.00	72.00	75.00	78.00	81.00	84.00	87.00	90.00	93.00	96.00	99.00	102.00	105.00	108.00

TABLE OF SCREEN GEOMETRICAL SIZES AND SQUARES

BladeLED

16:9	NUMBER OF MODULES	1	2	3	4	5	6	7	8
	m	0.800	1.600	2.400	3.200	4.000	4.800	5.600	6.400
1	0.800	0.64	1.28	1.92	2.56	3.20	3.84	4.48	5.12
2	1.600	1.28	2.56	3.84	5.12	6.40	7.68	8.96	10.24
3	2.400	1.92	3.84	5.76	7.68	9.60	11.52	13.44	15.36
4	3.200	2.56	5.12	7.68	10.24	12.80	15.36	17.92	20.48
5	4.000	3.20	6.40	9.60	12.80	16.00	19.20	22.40	25.60
6	4.800	3.84	7.68	11.52	15.36	19.20	23.04	26.88	30.72
7	5.600	4.48	8.96	13.44	17.92	22.40	26.88	31.36	35.84
8	6.400	5.12	10.24	15.36	20.48	25.60	30.72	35.84	40.96
9	7.200	5.76	11.52	17.28	23.04	28.80	34.56	40.32	46.08
10	8.000	6.40	12.80	19.20	25.60	32.00	38.40	44.80	51.20

ASPECT RATIO 16:9

9	10	11	12	13	14	15	16	17	18
7.200	8.000	8.800	9.600	10.400	11.200	12.000	12.800	13.600	14.400
5.76	6.40	7.04	7.68	8.32	8.96	9.60	10.24	10.88	11.52
11.52	12.80	14.08	15.36	16.64	17.92	19.20	20.48	21.76	23.04
17.28	19.20	21.12	23.04	24.96	26.88	28.80	30.72	32.64	34.56
23.04	25.60	28.16	30.72	33.28	35.84	38.40	40.96	43.52	46.08
28.80	32.00	35.20	38.40	41.60	44.80	48.00	51.20	54.40	57.60
34.56	38.40	42.24	46.08	49.92	53.76	57.60	61.44	65.28	69.12
40.32	44.80	49.28	53.76	58.24	62.72	67.20	71.68	76.16	80.64
46.08	51.20	56.32	61.44	66.56	71.68	76.80	81.92	87.04	92.16
51.84	57.60	63.36	69.12	74.88	80.64	86.40	92.16	97.92	103.68
57.60	64.00	70.40	76.80	83.20	89.60	96.00	102.40	108.80	115.20

TABLE OF SCREEN GEOMETRICAL SIZES AND SQUARES

FrameLED
ASPECT RATIO 4:3

4:3	NUMBER OF MODULES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	m	0.387	0.774	1.161	1.548	1.935	2.322	2.709	3.096	3.483	3.870	4.257	4.644	5.031	5.418	5.805	6.192	6.579	6.966	7.353	7.740	8.127
1	0.387	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	3.00	3.15
2	0.774	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.30	3.60	3.90	4.20	4.50	4.80	5.10	5.40	5.70	6.00	6.30
3	1.161	0.45	0.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50	4.95	5.40	5.85	6.30	6.75	7.20	7.65	8.10	8.55	9.00	9.45
4	1.548	0.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00	6.60	7.20	7.80	8.40	9.00	9.60	10.20	10.80	11.40	12.00	12.60
5	1.935	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00	9.75	10.50	11.25	12.00	12.75	13.50	14.25	15.00	15.75
6	2.322	0.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20	8.10	9.00	9.90	10.80	11.70	12.60	13.50	14.40	15.30	16.20	17.10	18.00	18.90
7	2.709	1.05	2.10	3.15	4.20	5.25	6.30	7.35	8.40	9.45	10.50	11.55	12.60	13.65	14.70	15.75	16.80	17.85	18.90	19.95	21.00	22.05
8	3.096	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60	10.80	12.00	13.20	14.40	15.60	16.80	18.00	19.20	20.40	21.60	22.80	24.00	25.20
9	3.483	1.35	2.70	4.05	5.40	6.75	8.10	9.45	10.80	12.15	13.50	14.85	16.20	17.55	18.90	20.25	21.60	22.95	24.30	25.65	27.00	28.35
10	3.870	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00	13.50	15.00	16.50	18.00	19.50	21.00	22.50	24.00	25.50	27.00	28.50	30.00	31.50
11	4.257	1.65	3.30	4.95	6.60	8.25	9.90	11.55	13.20	14.85	16.50	18.15	19.80	21.45	23.10	24.75	26.40	28.05	29.70	31.35	33.00	34.65
12	4.644	1.80	3.60	5.40	7.20	9.00	10.80	12.60	14.40	16.20	18.00	19.80	21.60	23.40	25.20	27.00	28.80	30.60	32.40	34.20	36.00	37.80
13	5.031	1.95	3.90	5.85	7.80	9.75	11.70	13.65	15.60	17.55	19.50	21.45	23.40	25.35	27.30	29.25	31.20	33.15	35.10	37.05	39.00	40.95
14	5.418	2.10	4.20	6.30	8.40	10.50	12.60	14.70	16.80	18.90	21.00	23.10	25.20	27.30	29.40	31.50	33.60	35.70	37.80	39.90	42.00	44.10
15	5.805	2.25	4.50	6.75	9.00	11.25	13.50	15.75	18.00	20.25	22.50	24.75	27.00	29.25	31.50	33.75	36.00	38.25	40.50	42.75	45.00	47.25

TABLE OF SCREEN GEOMETRICAL SIZES AND SQUARES

BladeLED
ASPECT RATIO 4:3

4:3	NUMBER OF MODULES	1	2	3	4	5	6	7	8	9	10
	m	0.800	1.600	2.400	3.200	4.000	4.800	5.600	6.400	7.200	8.000
1	0.800	0.64	1.28	1.92	2.56	3.20	3.84	4.48	5.12	5.76	6.40
2	1.600	1.28	2.56	3.84	5.12	6.40	7.68	8.96	10.24	11.52	12.80
3	2.400	1.92	3.84	5.76	7.68	9.60	11.52	13.44	15.36	17.28	19.20
4	3.200	2.56	5.12	7.68	10.24	12.80	15.36	17.92	20.48	23.04	25.60
5	4.000	3.20	6.40	9.60	12.80	16.00	19.20	22.40	25.60	28.80	32.00
6	4.800	3.84	7.68	11.52	15.36	19.20	23.04	26.88	30.72	34.56	38.40
7	5.600	4.48	8.96	13.44	17.92	22.40	26.88	31.36	35.84	40.32	44.80





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