100 YEARS BECK

ELECTRONIC FAMILY

INSIGHTS 2025

DISPLAYS

BECK GmbH & Co. Elektronik Bauelemente KG

100 YEARS BECK ELEKTRONIK
THE e-FAMILY

COMPANY HEADQUARTER, NUREMBERG (IMAGE: BECK ELEKTRONIK)

INSIGHTS INTO INNOVATIVE DEVELOPMENTS

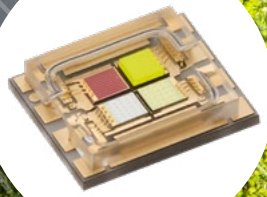
BECK Elektronik, a globally active contract distributor of electronic components, serves well-known customers in Europe, America and Asia with over 100 dedicated employees at several locations in Germany and Asia. 100 years of family-run business with headquarters in Nuremberg, Germany, now in its fourth generation. Beck Elektronik always offers the right solution for our customers in the automotive, power electronics, HMI (displays), industrial electronics, aerospace, medical technology, LED lighting and renewable energy sectors.
In this brochure, we present the innovations in our display area from 2024 and 2025.
See for yourself what we do – we look forward to hearing from you!

Your team from Beck Elektronik

PASSIVE COMPONENTS

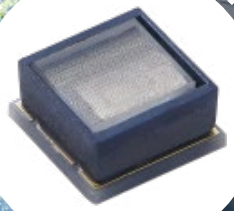
ACTIVE COMPONENTS

LED



DISPLAYS

OPTOELECTRONICS



ELECTROMECHANICAL COMPONENTS

100 YEARS BECK

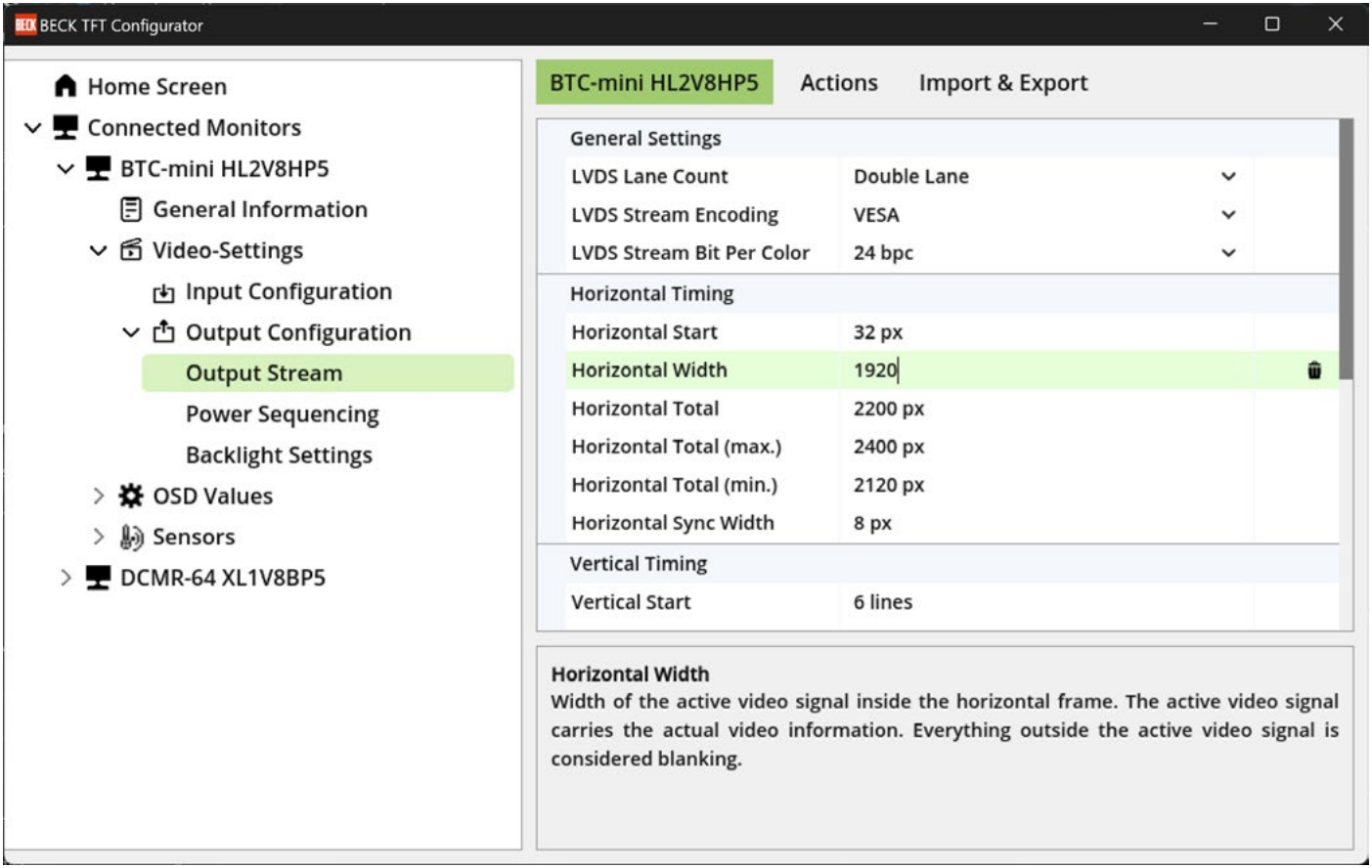
TFT CONTROLLER SOFTWARE FOR EASY DISPLAY CUSTOMIZATIONS

APPLICATION EXAMPLE OF THE BECK TFT CONTROLLER SOFTWARE (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

FREE BECK TFT CONTROLLER SOFTWARE ENABLES DISPLAY ADJUSTMENTS BY THE CUSTOMER

MIKE SCHMIDT, PRODUCT MANAGER DISPLAYS
AT BECK ELEKTRONIK
02/18/2025

For the use of industrial displays, TFT controllers such as the DCMR-64 and BTC-mini from BECK Elektronik are essential. Not only do they convert the manufacturer-specific display interface into common video signals like VGA, DVI, or DisplayPort, but they are also capable of modifying the input signal to, for example, increase contrast or achieve accurate color reproduction. With the latest firmware version v1.9 of the BTC-mini and DCMR-64 TFT controllers, customers can now adjust the controllers themselves at their production site via the used video interface, adapting them to the target display through software. Additionally, image settings such as brightness, saturation, or gamma can be conveniently adjusted from the host computer. Configuration is carried out using free tools, either through a graphical user interface, a command-line program, or a C++ library.



SCREENSHOT OF THE BECK TFT CONTROLLER SOFTWARE »VIDEO STREAM SETTINGS« (IMAGE: BECK ELEKTRONIK)

This offers customers several advantages:

- **Fast Design-In:** Thanks to on-site configurability, the controllers can be quickly and easily adapted to a new display by the customer via software.
- **Automatic Adjustments:** Settings known from the »OSD menu«**,** such as brightness, contrast, saturation, or gamma, can be automatically configured to the desired settings.
- **Automated Product Testing:** Since all settings are accessible, automated product tests for quality assurance can be carried out.
- Additionally, the new feature enhances the existing capabilities of BECK TFT controllers to communicate with brightness, temperature, or humidity sensors connected to the controller by enabling the host PC to read and evaluate the sensor values. This provides extended application and customization options for specific requirements while simultaneously reducing external hardware costs for the customer.

See the BECK TFT controller software in action here:

HTTPS://YOUTU.BE/58JJHTZIJOC

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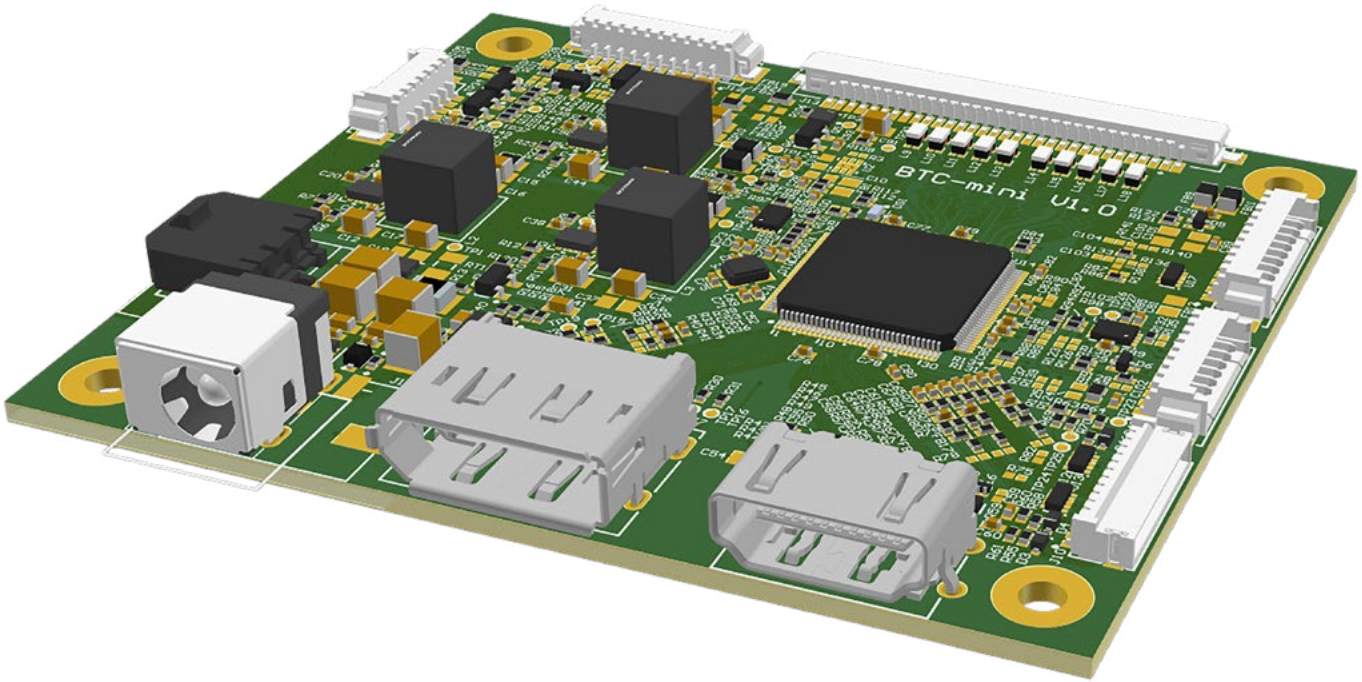

BTC-MINI; BECK TFT CONTROLLER (IMAGE: BECK ELEKTRONIK)

INNOLUX MINI LED
LOCAL DIMMING TECHNOLOGY

APPLICATION EXAMPLE: USE OF MINI LED DISPLAYS IN MEDICAL TECHNOLOGY (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

INNOLUX MINI LED DISPLAY: NEW »LOCAL DIMMING« BACKLIGHT TECHNOLOGY

STEPHAN FRONCZEK, PRODUCT MANAGER DISPLAYS
AT BECK ELEKTRONIK
01/21/2025

Mini-LED backlight technology marks a significant advance in display development. This progressive backlight technology has already proven itself in the consumer and automotive markets and is now rapidly gaining traction in the industrial sector. With the ability to deliver precise brightness control and deeper blacks, a new standard in image quality has been quickly set. The enormous potential of mini LED backlights is particularly evident in industries that rely on detailed illustrations, high brightness and challenging environmental conditions – be it medical, aerospace, marine, military or any other HMI systems.

Today, this technology combines superior image quality with energy efficiency and ruggedness and is becoming one of the preferred solutions for demanding display requirements.

The technology behind Mini-LED and local dimming

Mini LED technology is based on the use of extremely small LEDs (mini LEDs), which are placed in large numbers behind the screen. In contrast to conventional LED backlights, mini LEDs enable much more precise control of the backlighting. Contrast, brightness and picture quality are raised to a new level, particularly through the combination with local dimming (the control of backlighting depending on the picture content).

For this local dimming, the picture content must be evaluated and the brightness value for the screen divided into zones assessed. Innolux has developed corresponding integrated circuits for this purpose: For MIPI, Innolux offers a corresponding chip for the MCU board, for LVDS a Bcon backlight controller and for eDP the function is included in the Tcon timing controller.

The most important advantages of mini LED backlights with local dimming

- **Improved brightness and contrast:** Mini-LEDs can achieve higher brightness and at the same time precisely depict dark areas of the picture, which offers a clear advantage, especially with HDR content
- **Local dimming:** Fine control of the backlight in many small zones significantly improves the contrast ratio. This leads to deeper blacks and more realistic color reproduction
- **High energy efficiency:** The targeted control of the LEDs reduces energy consumption by only illuminating the areas of the screen that are actually needed
- **Less heat development**
- **Durability and robustness:** Mini LED displays have a longer service life and are less susceptible to the burn-in effects that can occur with OLEDs

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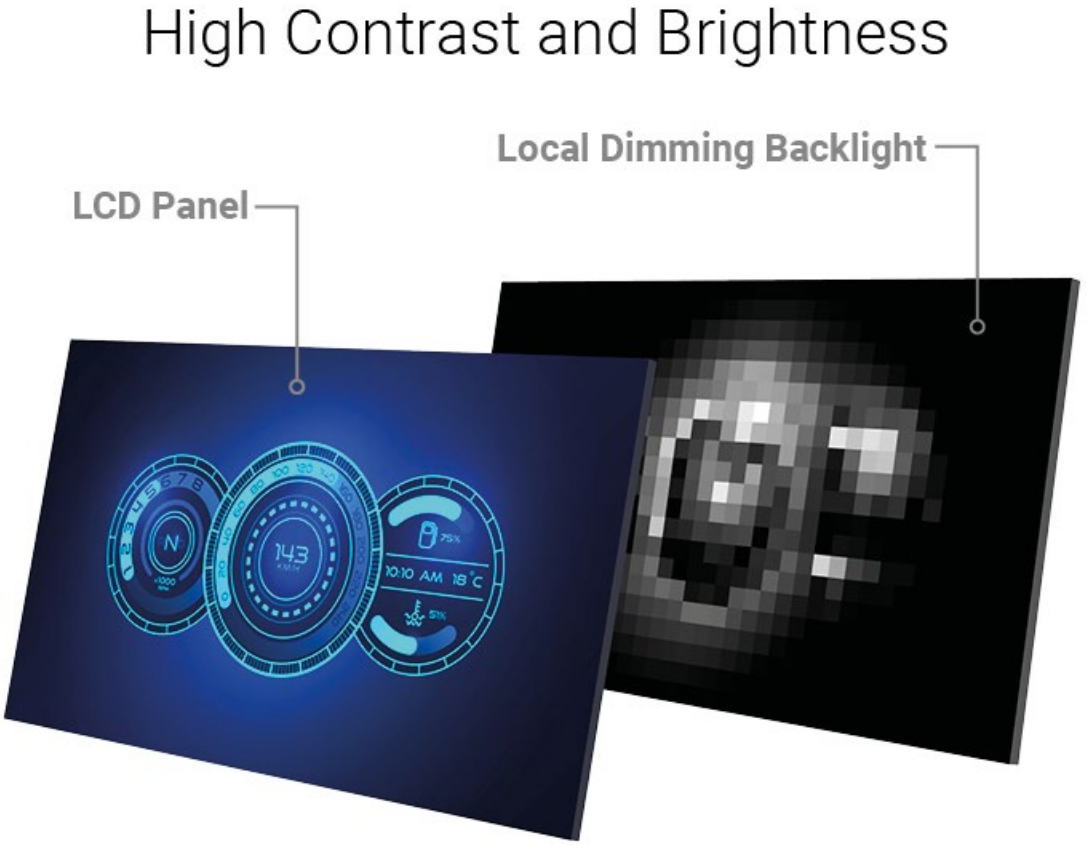

SCHEMATIC REPRESENTATION OF A MINI LED DISPLAY (IMAGE: BECK ELEKTRONIK)

LEXTAR MINI-LED DISPLAY
EXTERIOR VEHICEL LIGHTING

APPLICATION EXAMPLE: LEXTAR MATRIX MINI-LED DISPLAY FOR EXTERIOR VEHICLE LIGHTING (IMAGE: LEXTAR / ADOBE STOCK)

INNOVATIVE LIGHTING SOLUTIONS: THE MATRIX MINI-LED DISPLAY FROM LEXTAR

TAREK CHATI, KEY ACCOUNT MANAGER AUTOMOTIVE
AT BECK ELEKTRONIK
09/30/2024

A clear trend is emerging in the automotive industry: Mini-LED displays are revolutionizing the interaction between vehicles and their surroundings. This innovative technology is more than just a visual enhancement – it brings decisive advantages in terms of safety and communication.

Pioneering technology for automotive lighting

Mini LED displays are setting new standards in exterior vehicle lighting. Car manufacturers and end customers value these displays for their ability to communicate dynamic messages to pedestrians and other road users. The technology combines personalization, message communication and safety enhancements in one system. This means that vehicles can not only display individual designs, but also communicate important information such as warnings or instructions, which significantly increases road safety.

Leading car manufacturers are already integrating these advanced displays into their new vehicle models. They combine classic white light with full-color RGB displays, further strengthening the trend towards customizable lighting systems. This development marks the beginning of a new chapter in vehicle lighting that is not only functional but also stylish.

FRONT FULL-COLOR LIGHT DISPLAY + FRONT WHITE LIGHT DISPLAY + FRONT FULL-COLOR LIGHT DISPLAY (IMAGE: LEXTAR)

Outstanding technical features

The front full-color/white light display from LED specialist Lextar Electronics Corporation offers impressive technical features that make it the ideal solution for modern vehicles:

- **High brightness and contrast ratio** for maximum visibility
- **Excellent grayscale** for a detailed color display
- **Combination of full color display** (RGB daytime running light) **and white light display** (logo display) for an optimal balance between style and safety

Front White Light Display	
Module Size (mm)	920 x 125
Color	White
Brightness (nits)	30.000
Pitch	1
Pixel	180 × 120
Gray Level (bits)	16

Front Full-Color Light Display	
Module Size (mm)	920 x 125
Color	RGB
Brightness (nits)	5.000
Pitch	0.75
Pixel	480 × 120 (2 set)
Gray Level (bits)	16

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APPLICATION EXAMPLE (IMAGE: ADOBE STOCK)

E INK SPECTRA 6
COLORED E PAPER DISPLAY

APPLICATION EXAMPLE: USE OF AN E INK SPECTRA 6 DISPLAY FOR ADVERTISING (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

REVOLUTIONARY FULL-COLOR E PAPER DISPLAY E INK SPECTRA 6

ANNA RYBALKO, PRODUCT MANAGER DISPLAYS
AT BECK ELEKTRONIK
08/26/2024

The world of displays has made enormous progress in recent years, especially in the field of e paper technology. Beck Elektronik, as a long-time partner of E Ink Corporation, is proud to announce the mass production of the latest generation of Spectra 6 full-color displays. These displays set new standards in image quality and energy efficiency and open up exciting possibilities for numerous applications.

Advances in e paper technology

Since its beginnings with small, segmented displays, epaper technology has evolved rapidly. Today, we offer large formats and matrix substrates that have been transformed from monochrome solutions to impressive full-color displays.

Technical highlights of the Spectra 6 displays

The Spectra 6 series is available in the sizes 13.3“, 25.3” and 31.5”. These displays are characterized by their support of the QSPI interface, which enables direct control without an external control board and therefore saves costs. In addition, the Spectra 6 series offers an impressive color palette and uses an advanced algorithm to display vivid colors, making it particularly attractive for advertising applications.

IMPRESSIVE COLOR REPRODUCTION OF THE E INK SPECTRA 6 DISPLAY (IMAGE: BECK ELEKTRONIK)

Specifications at a glance:

- **13.3 inch (EL133UF1):** 1600 × 1200 pixels, QSPI interface
- **25.3 inch (EL253EW1):** 3200 × 1800 pixels, mini-LVDS interface
- **31.5 inch (EL315TW1):** 2560 × 1440 pixels, QSPI interface, optional power supply board
- **43.0 inch (EL430TWx):** 3840 × 2160 pixels

The Spectra 6 displays support a resolution of up to 200 pixels per inch (PPI) and offer a typical contrast ratio of 30:1. They are designed for an operating range of 0–50 degrees Celsius, making them ideal for a variety of environmental conditions.

A quantum leap in display technology

E Ink Spectra 6 is undoubtedly the most anticipated E Ink technology of 2024. Thanks to its extended color spectrum and advanced color image algorithm, it is an ideal solution for applications that require high image quality and low power consumption. This makes it a suitable replacement for print-medias, including POP displays, signages and posters.

Another highlight of the Spectra 6 displays is the E Ink Sparkle™ effect, which attracts attention through an image flash effect and thus increases the effectiveness of advertising.

For further information, please get in touch with your contact person in our company at any time or send us an e-mail to info@beck-elektronik.de

APPLICATION EXAMPLE (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

TOUCH DISPLAYS
CUSTOMIZED SOLUTIONS

APPLICATION EXAMPLE: INDUSTRIAL USE OF A CUSTOMIZED TOUCH DISPLAY (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

OUR CUSTOMIZED TOUCH DISPLAY SOLUTIONS FOR YOUR VISIONS

DIETMAR THOM, SALES MANAGER DISPLAYS
AT BECK ELEKTRONIK
08/19/2024

In today's dynamic world, customized solutions are the key to standing out from the competition and optimally meeting specific requirements. Our customized touch display solutions offer you the flexibility and adaptability you need to successfully implement your projects.

Wide range of display formats and sizes

We offer a wide range of display formats up to a size of 13.3 inches. On request, we will be happy to check the implementation options for larger display diagonals. The selection of the right display partner depends on your specific requirements. Our solutions are also available for low minimum order quantities (MOQ), so that even small projects can benefit from our extensive expertise.

Individual advice and support

Our experienced product managers support you throughout the entire design-in process. Together with you, we develop customized solutions that are precisely tailored to your needs. Our customizations cover various areas:

- **Interface:** Mini-LEDs can achieve higher brightness and at the same time precisely depict dark areas of the picture, which offers a clear advantage, especially with HDR content
- **Touch technologies:** Fine control of the backlight in many small zones significantly improves the contrast ratio. This leads to deeper blacks and more realistic color reproduction
- **Cover Lens:** The targeted control of the LEDs reduces energy consumption by only illuminating the areas of the screen that are actually needed
- **Brightness:** Mini LED displays have a longer service life and are less susceptible to the burn-in effects that can occur with OLEDs

Applications in various industries

Our display solutions are ideal for a wide range of applications. Our customized touch displays have proven particularly successful in the industrial and medical sectors. Our commitment to quality and customer satisfaction is at the heart of everything we do. We work closely with you to bring your vision to life. From the initial consultation to the final implementation – we are at your side.

MINI LED TECHNOLOGY
NEW TYPE OF BACKLIGHT

APPLICATION EXAMPLE: MEDICAL USE OF MINI LED DISPLAY TECHNOLOGY (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

MINI-LED TECHNOLOGY – THE FUTURE OF DISPLAY TECHNOLOGY

ANNA RYBALKO, PRODUCT MANAGER DISPLAYS
AT BECK ELEKTRONIK
7/29/2024

Display technology is constantly evolving to meet the increasing demand for better optical properties. One of the most innovative developments in this field is mini-LED technology, whose outstanding properties make it particularly suitable for use in the medical, EV charging and farming sectors.

What is Mini-LED?

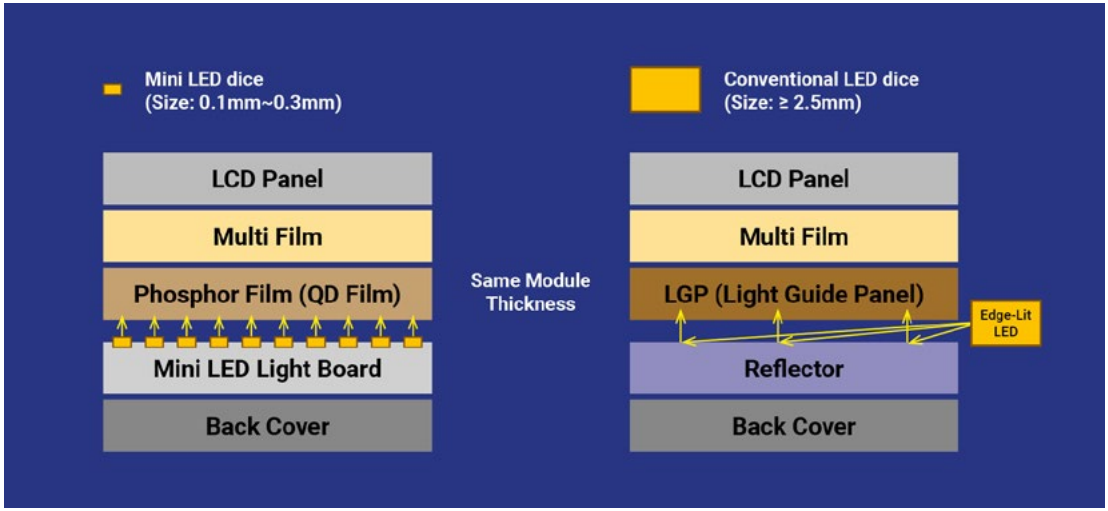
Mini-LED stands for a new type of backlight in which many small LED chips are densely distributed across the backlight board instead of a common backlight level. Each of these LED chips supports local dimming, resulting in higher contrast, higher brightness and a wider color gamut with lower power consumption.

Comparison with other technologies

The table below shows the advantages of mini LED technology compared to conventional LED and OLED technology.

It is clear from this table that mini LED displays are a superior choice for many applications. They not only offer better optical properties, but also a longer service life and lower energy consumption compared to conventional LEDs and OLEDs.

	Conventional LED	Mini-LED	OLED
Contrast	800-1.000:1	**10.000:1**	10.000+:1
Brightness (nits)	>1000	**>1500**	>500
Life time	Long	**Long**	Shot
Power consumption	High	**Low**	Medium
Burn-in of images	No	**No**	Yes



COMPARISON OF THE STRUCTURE OF A MINI-LED AND A CONVENTIONAL LED (IMAGE: BECK ELEKTRONIK)

Mini-LED in practice: The new 15.6 inch display from Ampire

An outstanding example of the advantages of mini LED technology is the new 15.6 inch display from the well-known manufacturer Ampire. This display impresses with the following features:

- **Screen diagonal:** 15.6 inch
- **Technology:** IPS with wide viewing angle
- **Interface:** LVDS
- **Brightness:** 1500 nits
- **Lifespan:** 50,000 hours
- **Local dimming range:** 576
- **Contrast:** 10,000:1

The display has a COB (Chip-on-Board) structure, which makes it thinner than comparable POB (Package-on-Board) structures and offers better color performance (NTSC 110%). These features make the display particularly attractive for professional applications where excellent image quality and reliability are essential.

Areas of application for Mini LED technology

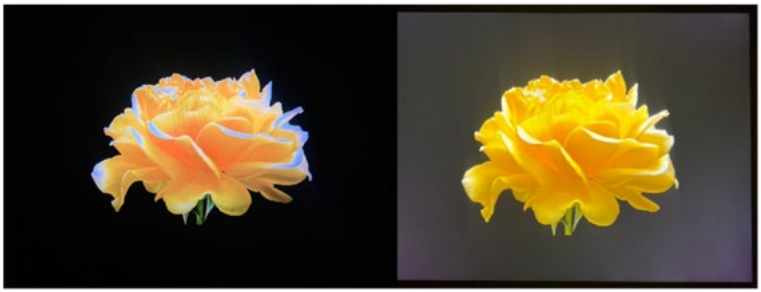
The versatility and performance of Mini LED technology enables it to be used in a wide range of areas:

- **Medical (e.g. operating room)**: In the medical field, especially in operating theaters, precise and relia-

ble image displays are essential. Mini LED displays provide the necessary image quality and accuracy to support medical professionals in their demanding tasks

- **Farming:** In agriculture, mini LED displays are used to monitor environmental data and control agricultural equipment. The high brightness and wide color gamut enable clear visibility of information even in direct sunlight
- **EV Charging:** In charging stations for electric vehicles, mini LED displays provide a clear and easy-to-read display of charging information, even in difficult lighting conditions
- **Tablet:** In tablets, mini-LEDs offer excellent image quality with high contrast and richer colors, which significantly improves the user experience for multimedia applications and games
- **Marine:** In marine applications, mini LED displays are ideal for navigation systems and other maritime applications as they offer high brightness and reliability in extreme weather conditions

With these diverse areas of application, mini LED technology demonstrates its enormous potential to benefit a wide range of industries with its outstanding properties.



LEFT: MINI-LED, RIGHT: CONVENTIONAL LED (IMAGE: AMPIRE)

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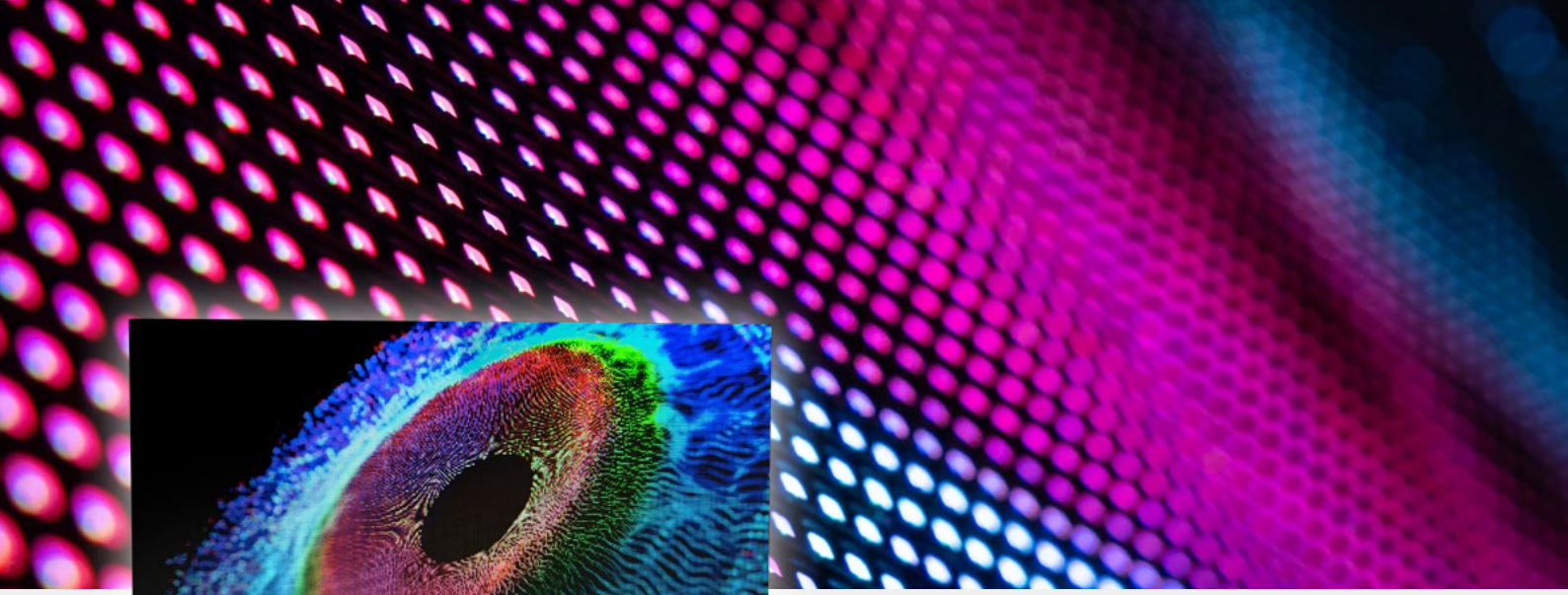


MINI LED DISPLAY
SCALABLE LED VIDEO WALL

APPLICATION EXAMPLE (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

INNOVATIVE LED DISPLAY MODULE FROM YENRICH WITH PIXEL PITCH < 1MM

NICOLAI BECK, CEO
AT BECK ELEKTRONIK
07/08/2024

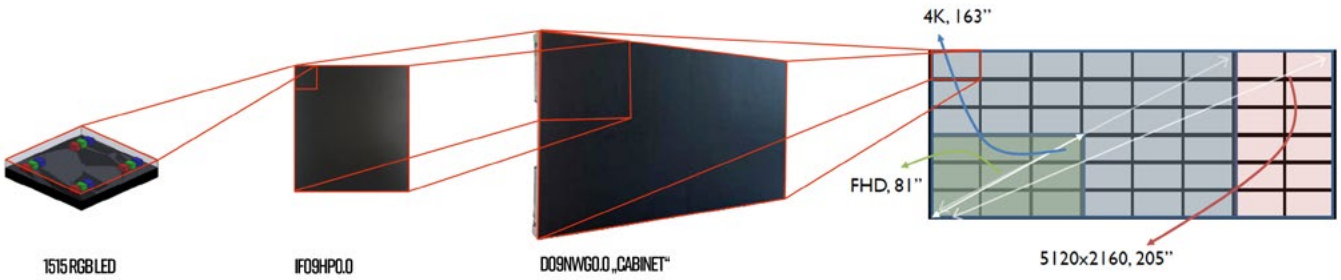
The technological development of Light Emitting Diodes (LEDs) has revolutionized the display market. Yenrich Technology Corporation (Yenrich) presents its latest product, a full-color LED display module with a pixel pitch of less than 1 mm, which sets new standards in display technology. The modular design of this display offers versatile application possibilities, from small handheld devices to gigantic video walls with 4K resolution and more.

Outstanding benefits of LED displays

- **Brightness and contrast:** Excellent visibility, color accuracy and increased image quality even in bright daylight
- **Durability:** Robust and long-lasting LEDs that can be used in various environments
- **Flexibility:** Customizable in size and shape for various applications
- **Reduced space requirement:** A low overall height enables installation in narrow applications
- **Energy efficiency:** Low power consumption as LEDs are self-luminous and do not require backlighting
- **Repairability:** Modular design enables defective segments or individual LEDs to be replaced
- **Environmentally friendly**: No harmful materials such as mercury or boron

Technological differentiation Mini LED vs. Micro LED

In Mini LEDs, the epi/chip sits on a carrier substrate, whereas the Micro LED does not require a carrier and is therefore significantly smaller. The achievable pixel pitch for Mini LED displays is in the range of approx. 2 mm to 0.5 mm. Due to their size, the pitch of Micro LEDs is lower and therefore the resolution of the display is higher.



STRUCTURE OF THE IF09HP0.0 WITH 4IN1 1515 RGB PACKAGES (IMAGE: BECK ELEKTRONIK)

Product design LED display

The IF09HP0.0 module consists of 160 x 180 pixels and can be combined to form larger units. A single module measures 15 x 16.8 cm, offers 1000-2500 cd/m² brightness with a power consumption of 200 W/m² and a contrast of 8000:1. Six of these modules form the D09NWG0.0 cabinet, for example, with a resolution of 640 x 360 pixels and a screen diagonal of 27 inches. These cabinets can be seamlessly combined to create huge video walls that are perfect for advertising, public displays, conference rooms and retail spaces.

Yenrich's LED display modules with a pixel pitch of less than 1 mm offer outstanding image quality, flexibility and energy efficiency. Thanks to their modular design and advanced technology, they are ideal for a wide range of applications. Discover the future of display technology and see for yourself the versatility of Yenrich's LED displays.

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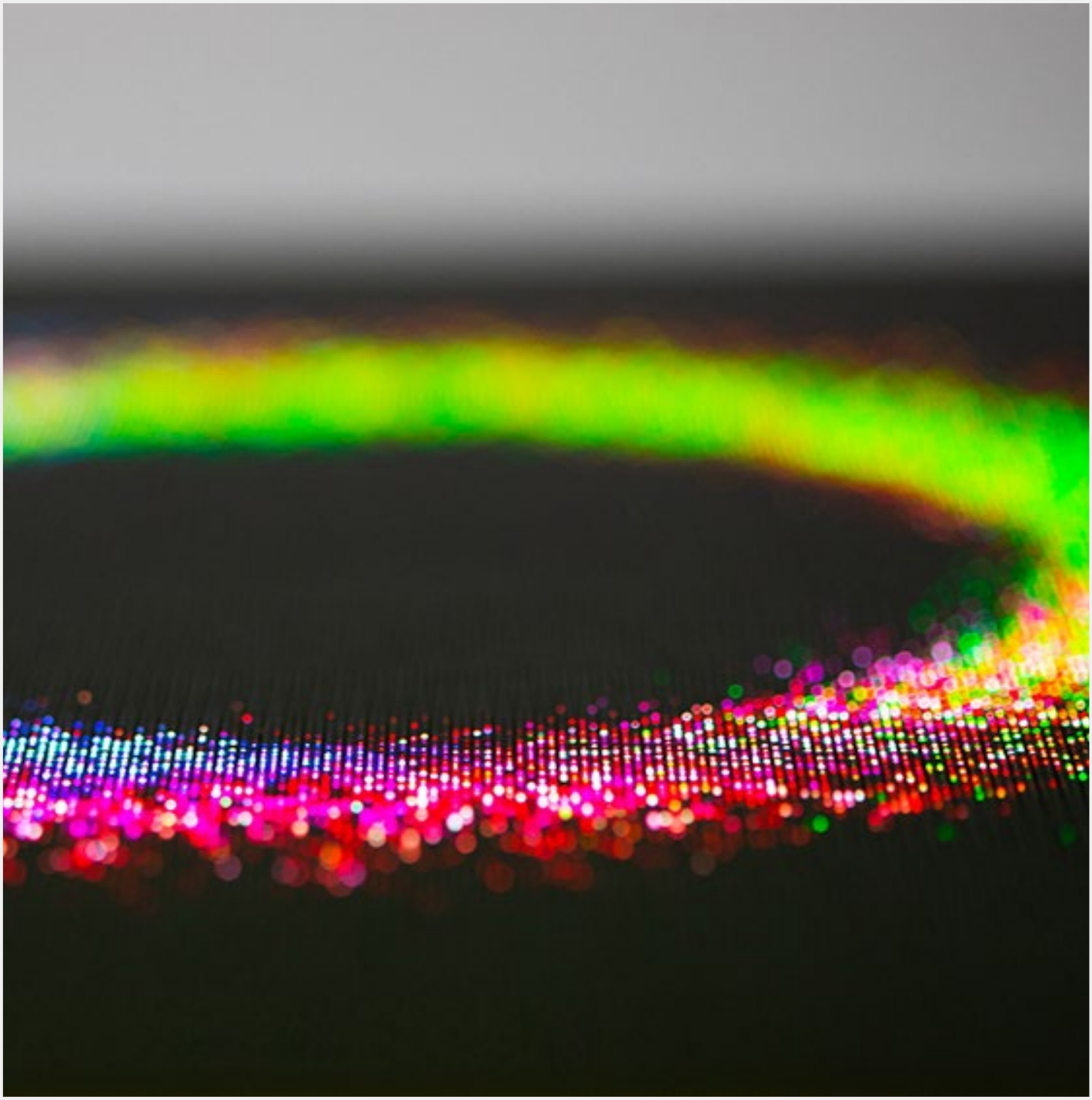

FULL-COLOR LED DISPLAY MODULE (IMAGE: BECK ELEKTRONIK)

PCAP SOLUTIONS
FLEXIBILITY AND ADAPTABILITY

APPLICATION EXAMPLE (IMAGE: BECK ELEKTRONIK / ADOBE STOCK)

THE PCAP PRODUCT RANGE FROM AMT AT A GLANCE

DIETMAR THOM, SALES MANAGER DISPLAYS
AT BECK ELEKTRONIK
06/10/2024

The use of touchscreen technologies has developed rapidly in various application areas, from portable devices to interactive displays. AMT, a leading manufacturer of touchscreen solutions, offers a diverse range of PCAP variants to meet the needs of a wide variety of applications. With screen sizes ranging from 5.7“ to 32“, these variants offer flexibility and scalability for different customer requirements. AMT‘s standard solutions are available in three different versions: as a simple PCAP film, with unprinted cover glass or with black printed cover glass. The version without printing is not much larger than the actual PCAP film, while the version with printing is larger all around to be integrated into a front.

In addition to their outstanding functionality, AMT‘s touchscreen solutions also allow for customization of the cover glass, including size, glass finish and printing, with custom designs or brand logos easily integrated.

AMT‘s PCAP products ensure fast time-to-market and help companies strengthen their competitive position. With fast production and delivery, they help companies respond flexibly to ever-changing market demands and shorten »time-to-market«.

Our aim is to offer customized solutions that meet the specific requirements and design ideas of our customers.

BLACK PRINTED COVER GLASS WITH PCAP FILM (IMAGE: BECK ELEKTRONIK)

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