New Is™

New Innovation
New Impression
New Imagination

At NEC LCD Technologies, Ltd.,
the 3 New "I"s inspire our mission
to create next-generation displays.

Environmental Initiatives

Our products are RoHS compliant.

In February 2003, the European Union (EU) issued the RoHS Directive*1 aimed at restricting the use of certain hazardous substances. As a result, electrical and electronic equipment containing any of the six target substances (lead, mercury, cadmium, hexavalent chromium, PBB*2 and PBDE*3) is restricted from the EU market, effective from July 1, 2006.
Out of concern for the environment, NEC LCD Technologies began reducing the use of hazardous substances in our LCD modules prior to the RoHS directive. We have completely eliminated all of the six substances targeted in the RoHS directive so that our products are now RoHS compliant.

*1 RoHS: Restriction of the use of certain hazardous substances in electrical and electronic equipment
*2 PBB: Polybrominated biphenyls
*3 PBDE: Polybrominated diphenyl ethers

(Note)
※The maximum concentration level allowed by the RoHS is 1000ppm for lead, mercury, hexavalent chromium, PBB, PBDE, and 100ppm for cadmium. (Indicates the concentration level in each section/part [homogeneous material]) Moreover, the Amendment to the RoHS Directive indicates applications that are exempt from Directive requirements, such as the lead inside high-melting point solder of electrical appliance parts and mercury amounting to less than 5mg in small fluorescent tubes.
※The RoHS Directive does not apply to spare parts for electrical and electronic equipment put on the market before July 1, 2006. Therefore, the following products are exempt from the RoHS Directive
①Products with maintenance notification that were shipped before the end of March 2005.
②Repair and maintenance of products produced before March 2006 that were not Directive-compliant.
*Some products and repair parts may be exempt from the above. Please consult your sales personnel for details.

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Soy Ink That's Air- and Earth-Friendly

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Oct. 2008 Vol.12
TFT-LCD Modules

Empowered by Innovation NEC

LCD NEWS

LCD Modules Products Guide

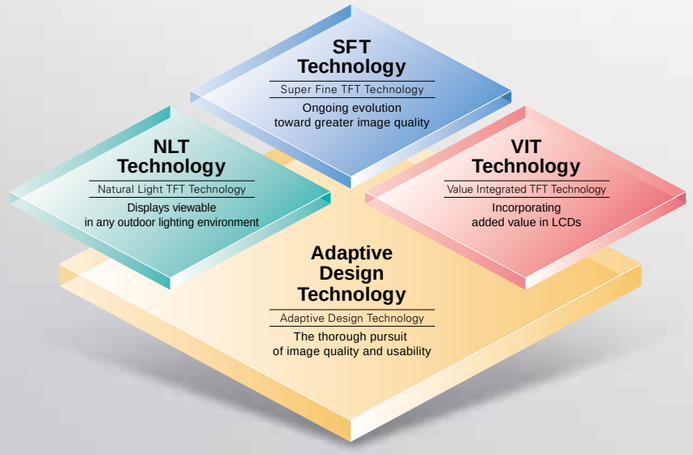
NEC LCD Technologies

Superior LCD solutions based upon NEC LCD Technologies' advanced core technologies

LCDs are gaining popularity as devices for displaying various types of information in many diverse environments. At the same time, customers are demanding greater sophistication and diversity from displays.

To meet the growing demand for higher image quality, smaller size, greater energy efficiency, higher added value, and improved environmental performance, NEC LCD Technologies offers various LCD products based on four core technologies: SFT Technology for outstanding image reproduction, NLT Technology for vivid images in any ambient light environment, VIT Technology for greater value, and integrated module technology called Adaptive Design Technology.

Based on our customer-oriented philosophy of seeing things from the customers' perspective, we strive to offer customers the best possible LCD solutions.



Four Core Technologies

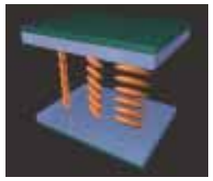
Continual innovation toward higher image quality.

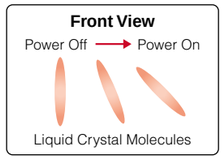
Image quality that specifications cannot adequately describe.

In LCD specifications the viewing angle refers to the maximum angle at which images can be viewed at an acceptable contrast ratio*1, such as 10:1. This angle is expressed as degrees (from the line perpendicular to the center of the screen). Since the contrast ratio is the only defining factor for image quality, an LCD can claim an 80-degree viewing angle even if the colors look completely different than when viewed from the front. Moreover, images on two LCD panels with the same maximum viewing angle but different LCD drivers can look very different when viewed from an angle.

An LCD varies the amount of light passing through the screen by applying voltage to liquid crystal molecules sandwiched between two polarizing plates and by changing the alignment and direction of the molecules. Many LCDs apply voltage in the vertical direction, which rotates the liquid crystal molecules vertically. But SFT displays apply voltage in the horizontal direction, which rotates the molecules horizontally. The amount of rotation depends on the voltage level and is used to vary the amount of light penetration. When the liquid crystal molecules are fully horizontal, their size appears identical regardless of the angle from which they are viewed. The difference in brightness and color at different viewing angles is therefore smaller with SFT displays than with conventional LCDs.

*1 The contrast ratio represents the contrast between the maximum brightness (white screen) and minimum brightness (black screen) in environments lacking any ambient light.





SFT Liquid Crystal Display

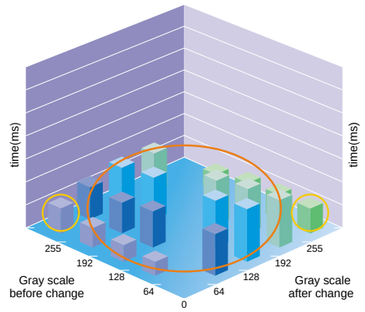
TN Liquid Crystal Display

※ The above images are samples.

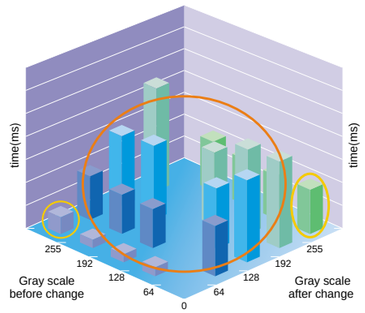
SFT technology also provides high-quality moving images.

Liquid crystal molecules tend to rotate more smoothly in the horizontal direction than the vertical direction. Since SFT LCDs enables display by rotating liquid crystal molecules horizontally, their response time is relatively fast, regardless of the magnitude of shift in gray scale. Moving images are also displayed very clearly because there is no sudden drop in response time between intermediate gray scales. There are no other technologies where liquid crystal molecules rotate vertically.

Response time of SA-SFT technology



Response time of TN technology



- **Spec Chart Response Time**
  (sum of yellow-circled figures)
  Although this is one indicator of LCD response time, it does not include the response time between intermediate gray scales.

- **Response Time Between Intermediate Gray Scales**
  (shown by the orange circle)
  Since most moving images consist primarily of changes between intermediate gray scales (even when the response time in the specifications is fast), if the response time between intermediate gray scales is slow, then the images may appear smeared.

High luminance and wide color gamut — for clear, vivid color.

High luminance and wide color gamut are both essential elements to achieve high LCD image quality. Until recently, however, one was possible only at the expense of the other.

Generally, LCD color representation is achieved through a combination of color filters and light source. An expansion in the color reproduction range (color gamut) can be attained by using color filters with thicker colored films. However, luminance declines if the color filter is combined with the backlight system, since LCD panel transmissivity decreases.

NEC LCD Technologies offers users both high luminance and wide color gamut in every LCD we produce — and the improved color performance that goes with them. The key breakthrough came as a result of the improved transmissivity achieved by our SFT technology.

The results are impressive. The transmissivity of SA-SFT*1 is approximately 1.4-fold that of A-SFT*2 , while the transmissivity of UA-SFT*3 is approximately 1.2-fold that of SA-SFT. Thus, a wide color gamut exceeding 70% the color gamut of NTSC is possible, without sacrificing luminance, for products intended for applications requiring accurate color reproduction. The clear, vivid color reproduction stands up to the toughest professional standards in applications including broadcasting, graphics and medical use.

Note: In monochrome products and other products intended for fields not requiring a wide color gamut, improvements in transmissivity based on SFT technology are being applied to achieve higher luminance.

*1 SA-SFT:Super-Advanced SFT *2 A-SFT:Advanced SFT *3 UA-SFT:Ultra-Advanced SFT

NL204153AC21-09
UA-SFT

NL160120AC27-22B
UA-SFT

NL10276BC30-17
UA-SFT

NL6448BC26-08D
UA-SFT

High luminance and high definition — to satisfy even the most demanding professionals.

As the demand for LCDs spreads to new and different applications, user needs grow more diversified and sophisticated. In healthcare, for instance, a new generation of doctors is turning to IT in their efforts to make more informed, accurate diagnoses. With this new trend, the role of digital displays has become more pivotal than ever in medical applications — with increasing demand for higher image reproduction.

To realize the high 3 megapixel-plus definition and smooth, precise gray scale characteristics demanded by applications for reading chest X-rays and mammograms, a luminant dynamic range and gamma characteristics independent of viewing angle are absolute prerequisites. NEC LCD Technologies addresses the exacting demands of these and other medical applications by offering ultra-high definition without sacrificing high luminance, thanks to the clear visibility of SFT technology.

NL204153BC21-02
SA-SFT

NL256204AM15-03A
SA-SFT

Products featuring SFT technology

For monitor use

22.5-inch	NL192120AC25-02 UA-SFT	
21.3-inch	NL204153AC21-09 UA-SFT	NL204153BC21-02
	NL204153AM21-07A	NL204153BM21-01/01A
	NL160120AC27-22B UA-SFT NEW	NL160120BC27-14
	NL160120BC27-10	NL160120AM27-13A
	NL160120BM27-03/03A	
20.1-inch	NL256204AM15-03A NEW	
19.0-inch	NL128102BC29-10 UA-SFT	NL128102BM29-05A

For industrial use

15.3-inch	NL12876BC26-25/25B	
15.0-inch	NL10276BC30-17 UA-SFT	
12.1-inch	NL8060BC31-20	
10.4-inch	NL8060BC26-28	NL8060BC26-27
	NL6448BC33-74	
9.0-inch	NL8048BC24-04 UA-SFT NEW	
8.4-inch	NL10276BC16-01 UA-SFT	NL6448BC26-08D UA-SFT

SFT is an abbreviation for Super Fine TFT.

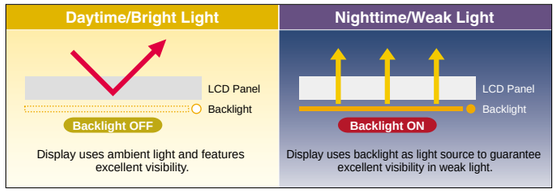
Clear images in any ambient light environment due to two NEC technologies : SR-NLT and ST-NLT.

SR-NLT guarantees high-visibility in any ambient light environment.

Adapts to changes in ambient light for bright, vivid displays with low power consumption!

NEC LCD Technologies' SR-NLT*1 is based on transflective (semi-transmissive) technology that has both the transmissive mode and reflective mode characteristics. At night, or in weak light, the display operates in transmissive mode with backlight as light source to guarantee excellent visibility. In daylight, or in bright light, the display uses reflective mode with ambient light and features excellent visibility. Low energy consumption is possible since visibility can be secured in high ambient light even with the backlight OFF. LCDs based on SR-NLT technology are appropriate for use in battery operated PDA, PND (small GPS terminal), handheld terminal applications, used either indoors or outdoors.

*1 SR-NLT:Super-Reflective NLT



Primary Feature Low energy consumption is possible since visibility can be secured in high ambient light even with the backlight OFF.

NL2432HC22-41B
SR-NLT

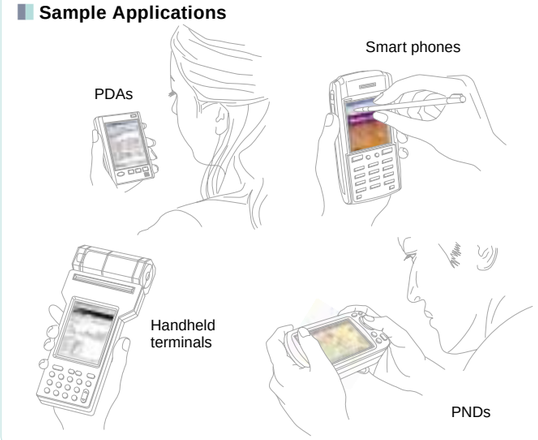
NL2432HC22-40A
SR-NLT

We raised the brightness in the transmissive mode and the reflection ratio in the reflective mode.

Transflective LCDs are comprised of a backlit transmissive field and a reflective field that utilizes ambient light. The distribution of pixels in the two zones largely determines the basic performance in the transmissive mode and the reflective mode. A larger transmissive field, for example, boosts brightness but reduces the reflection ratio due to a smaller reflective field. A larger reflective field, on the other hand, enhances visibility in bright environments while lowering the transmissive ratio due to a smaller transmissive field.

The SR-NLT solves this dilemma through a proprietary optical design that boosts the transmissive ratio of the transmissive field and the efficiency of the backlight. An exclusive reflective plate also enables far more efficient use of ambient light. Thus, brightness in the transmissive mode and the reflection ratio in the reflective mode are significantly increased without affecting backlight power usage. The balance between brightness and reflection ratio can also be optimized to suit different purposes and environments.

Sample Applications



Products featuring SR-NLT technology

For mobile use

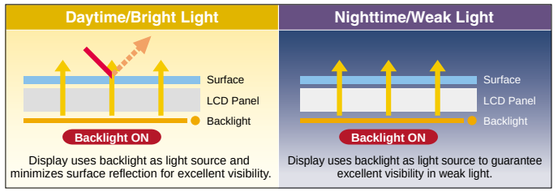
3.5-inch	NL4864HL11-01B	NL4864HL11-02A
	NL2432HC22-41B	NL2432HC22-40A
2.7-inch	NL2432HC17-04B	NL2432HC17-04A

ST-NLT achieves clear and bright displays even in sun light.

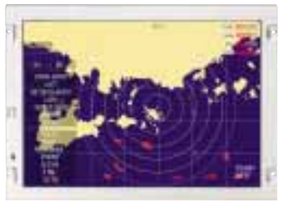
Unaffected by changes in outdoor light environments to ensure natural color anytime!

ST-NLT*1 is another innovative technology incorporating NEC LCD Technologies' proprietary optical design. It boosts the efficiency of the backlight's light utilization and minimizes the surface reflection of ambient light. It is a transmissive LCD that produces high-contrast (photopic contrast) images even in bright outdoor light found on sunny afternoons. It features a wider color reproduction range than reflective LCDs, making it the ideal choice for bright, vibrant color displays. NEC LCD Techonogies' extensive lineup of ST-NLT products ranges in size from 5.5-inch QVGA to 15.0-inch XGA. Thanks to a new advanced optical technology, our ST-NLT LCDs are ideal for ATMs, measuring devices, vending machines, and other industrial devices subject to use in bright sunlight.

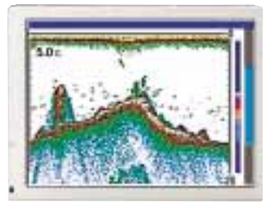
*1 ST-NLT:Super-Transmissive NLT



Primary Feature Guarantees clear, vivid color images even in high ambient light by using a backlight as a light source to minimize the surface reflection of outdoor light.



NL8060BC21-03
ST-NLT



NL6448BC20-20
ST-NLT

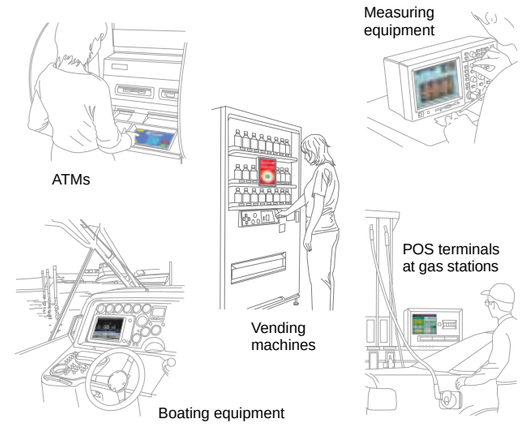
Backlight energy efficiency is raised and surface reflection is reduced at the same time.

Transmissive LCDs vary image visibility by controlling the amount of backlight illumination passing through the panel at a pixel level. In ordinary transmissive LCDs, this visibility deteriorates in bright environments, such as when outdoors in the daytime. This is largely due to insufficient LCD brightness, in comparison with the ambient brightness, as well as reflection of ambient light on the panel surface, which reduces photopic contrast.

Since transmissive LCD brightness is determined by backlight output and transmissive ratio, the lack of brightness in bright environments can be overcome by simply boosting backlight output. But this raises LCD power consumption.

The proprietary optical design of the ST-NLT enhances both the transmissive efficiency of the LCD and the energy efficiency of the backlight. This makes it possible to boost brightness, without raising backlight output, and reduce the reflection of ambient light. As a result, image visibility is improved in bright environments without increasing power consumption.

Sample Applications



Products featuring ST-NLT technology

For industrial use

15.0-inch	NL10276BC30-18C	
12.1-inch	NL10276BC24-13C	NL8060BC31-41C
10.4-inch	NL8060BC26-30C NEW	NL6448BC33-63C
	NL6448BC33-64C	
8.4-inch	NL8060BC21-03	NL6448BC26-09C
6.5-inch	NL10276BC13-01C	NL6448BC20-21C
	NL6448BC20-20	
5.5-inch	NL3224BC35-22	

NLT is an abbreviation for Natural Light TFT.

Higher-value-added LCDs open the door to new possibilities.

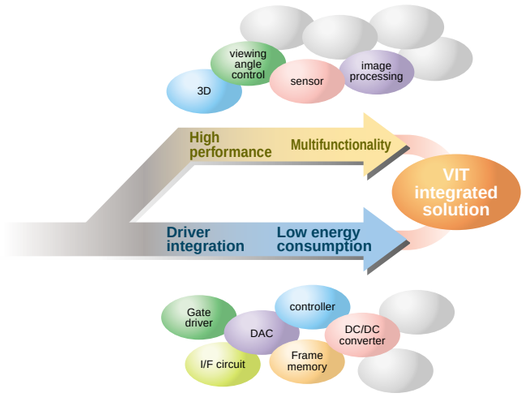
VIT for LCD innovation. There are currently 2 VIT technology trends.

VIT technology achieves greater added value by integrating various peripheral circuits and diverse functions into the LCD.

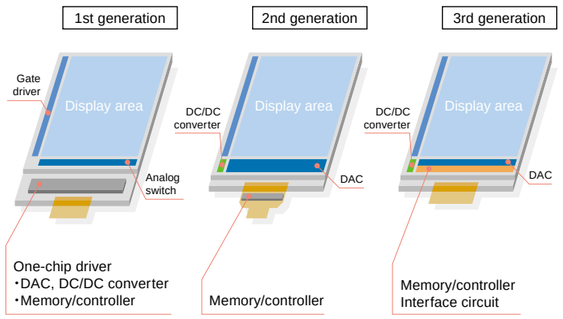
There are 2 technology trends employed in the use of VIT technology to achieve greater added value. One trend is to aim for compactness, low energy consumption, and improved reliability by integrating the various peripheral circuits related to the LCD. The other trend is to realize high LCD performance and multifunctionality through improvements in the display performance of the LCD and by incorporating various functions.

To more fully respond to detailed customer requests, NEC LCD Technologies is promoting these 2 technology trends and reflecting them in the development of new products.

Trends in VIT technology



VIT generation



High image definition, compact design, low energy consumption and improved reliability.

By integrating the display drive circuits onto the LCD glass substrate using VIT technology, it is possible to significantly reduce the number of connections with external circuits as compared to COG*1 and COF*2 designs that employ external drive circuits. This allows for higher image definition that is less affected by the connecting pitch to external drive circuits.

When taking the LCD into account as a full display module that includes a backlight system and external circuit board, the reduced number of components and connected lines results in a smaller, slimmer, more lightweight display as well as improved resistance against shock and vibration.

In the future, NEC LCD Technologies will aim for the realization of a Zero Chip Display, which can be directly coupled to the MPU bus line of the system by integrating the circuits necessary for display, such as the DC/DC converter, controller, interface circuit and image frame memory, onto the glass substrate.

*1 COG (Chips On Glass) : Method of directly placing IC chips on glass substrate
*2 COF (Chips On Film) : Method of directly placing IC chips on Flexible Film

2.7" TFT color LCD module achieving high definition of 413ppi.

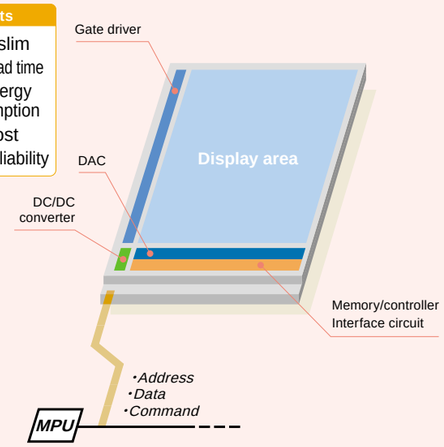
NL9654HL06-01J

VIT

Zero Chip Display

Characteristics
・Zero chip = Driver LSI unnecessary
・Connects directly to MPU bus line

Merits
- Small/slim
- Short lead time
- Low energy consumption
- Low cost
- High reliability



Enhanced sophistication and multi-functionality in addition to added value.

VIT technology contributes to higher LCD performance and multifunctionality.

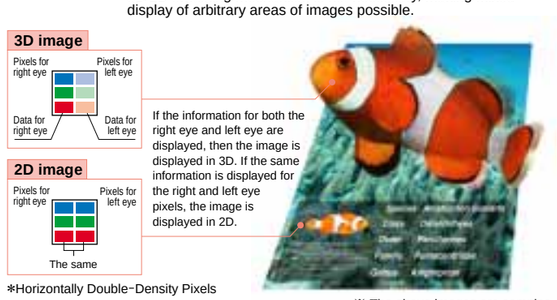
Progress has already been made in the development of unique high-definition 3D displays and LCDs that enable switching of viewing angle in accordance with usage and changes in the environment.

In addition, developments are currently being made to integrate the image processing circuits of external LSI chips, sensor functions usually installed on the surface of the LCD panel, and other features on the LCD glass substrate.

With these developments, it becomes possible to reduce the number of parts, achieve a more compact design, and reduce the number of man-hours when developing equipment and devices that incorporate LCDs.

2D/3D mixed displays based on HDDP* structure

Characteristics
- Stereovision with the naked eye is possible, without compromising display quality of 2D images.
- 3D/2D switching mechanism is not necessary, making mixed display of arbitrary areas of images possible.



*Horizontally Double-Density Pixels

※ The above images are samples.

Viewing angle control based on VIT technology

Characteristics
- By turning the voltage signal ON or OFF, the viewing angle can be switched easily.
- The viewing angle in the narrow-viewing-angle mode can be set as needed in the design stage.

Application examples: ATMs, kiosk terminals, automated ticketing devices, etc.

Wide viewing angle

e.g.Displays information, advertisements, etc., at a wide viewing angle when ATM is not in use.

Narrow viewing angle

e.g.Viewing angle control enables privacy when ATM is in use.

Viewing angle is narrow and image cannot be seen from sides.

※ The above images are samples.

Responding to customer requests in a more specific and timely manner.

VIT technology also helps shorten the total development period for LCDs. The circuits in regular LCD panels, including the TFT drive circuit, are realized through LSI chips. However, standard lead time to work with a chip company to develop new specialized LSI chips is approximately 8 to 10 months — a large setback in the timely commercialization of LCDs incorporating the latest functions and specifications.

If LSIs can be formed directly on glass substrates, then the development period for new LCDs can be significantly reduced since it is no longer necessary to develop new LSI chips.

VIT technology allows direct formation of LSIs on glass substrates for more timely response to specific customer requests, which are becoming more diversified.

TFT color LCD module featuring LSI with DRAM frame memory integrated onto the glass substrate (prototype)

NL4864HL11-01B

VIT

NL8048HL11-01B

VIT

Products featuring VIT technology

For mobile use

4.1-inch	NL8048HL11-01B	
3.5-inch	NL4864HL11-01B	NL4864HL11-02A
2.7-inch	NL9654HL06-01J	

VIT is an abbreviation for Value Integrated TFT.

Customer needs drive our efforts to further enhance LCD quality and usability.

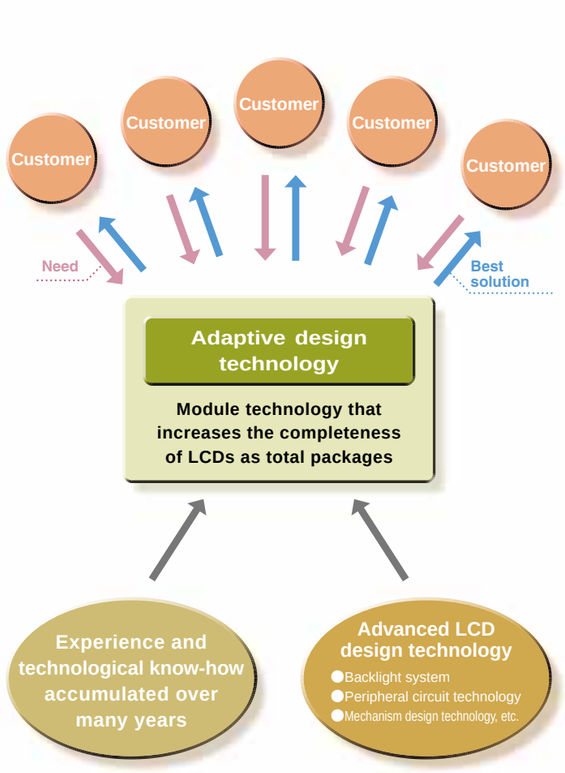
Module technology that makes LCDs more complete.

Unlike the LCDs used in consumer-oriented products such as household televisions and computer monitors, the LCDs built into various industrial equipment must adapt to a rapidly expanding list of specifications.

Adaptive design technology, the 4th core technology of NEC LCD Technologies, fulfills the requests of customers from various industries in a detailed manner by fusing the cutting-edge technologies with technological know-how accumulated over many years.

In contrast to SFT, NLT and VIT technologies as panel technologies designed to improve LCD panel performance, adaptive design technology is module technology that increases the completeness of LCDs as a total package by integrating backlight systems, peripheral circuits and mechanism design.

Adaptive design technology is applied to every product in the NEC LCD Technologies lineup.



Optimal solutions that meet customer needs.

The specifications sought in various industrial equipment LCDs relate to more than display performance. Industrial LCDs must meet a wide variety of detailed requirements in terms of module size, temperature attributes, interface, power consumption and other factors in accordance with various conditions, such as application, usage environment and other circumstances unique to the piece of equipment.

Take industrial equipment designed and built for long-term production as an example. In applications like these, NEC LCD Technologies facilitates smooth, ongoing performance by maintaining product interface and mounting compatibility — for quick, easy replacement and upgrading of our latest high-quality, high-performance LCDs.

On the other hand, for applications where a more compact and energy-saving design is required, progress has been made in developments related to lightweight, energy-saving products with a narrow frame and slim body. Recently, we have also been promoting a lineup of wide-format products to meet needs for displaying more information in a limited amount of space, as well as for displaying digital moving images. We are also in the process of expanding the operating temperature range so that our equipment can be used in more diverse environments.

The product lineup of NEC LCD Technologies provides "optimal" solutions that meet diverse customer needs.

Long-term Support

- Interface compatibility support
- Installation compatibility support

Reduces device design costs when replacing existing products with new devices or upgraded versions

Optimal design

- Narrow frame
- Compact
- Lightweight
- Low energy consumption
- Wide

Helps make equipment more compact and energy efficient. Adapted to various design constraints

Wide operating temperature range

- Guaranteed operation in -20℃/-10℃ to 70℃ temperature range

Accommodates a wide range of outdoor applications, such as in motorized vehicle interiors and other extreme temperature environments

A proposal for an optimal backlight system.

The backlight system plays an extremely important role among the elements in adaptive design technology. It can affect the specifications for luminance, color reproduction, module size, weight, power consumption and temperature attributes.

Common edge-light backlight systems for displays larger than 5 inches use CCFL*1 as a light source, while those smaller than 5 inches use white LED*2 as a light source. Products that require extremely high luminance, such as for medical diagnosis by radiograph interpretation, use several aligned CCFLs beneath the LCD panel.

In recent years, there has been a rapid increase in white LED backlight systems even for modules larger than 5 inches, as their resistance to vibration and shock has improved through lightweight designs with slim bodies and low energy consumption. These offer many advantages, such as the control of high-frequency noise and harmonic currents, as well as the elimination of mercury.

NEC LCD Technologies has developed a wide range of backlight systems and is making efforts to further increase their efficiency.

*1 CCFL (Cold Cathode Fluorescent Lamp) : A thin fluorescent tube that generates light by discharging electrons without requiring heat.
*2 LED (Light-Emitting Diode) : A semiconductor device that generates light when voltage is applied.

NL204153AM21-07A

NL160120AM27-13A

Products equipped with a high-intensity, direct backlight system

For monitor use

21.3-inch	NL204153AC21-09	NL204153AM21-07A
	NL160120AC27-22B NEW	NL160120AM27-13A

Color and gray-scale reproduction approaching "the original".

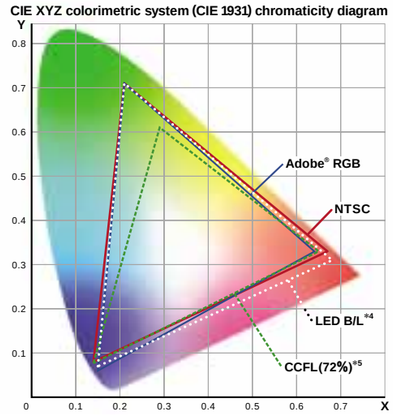
We believe that high LCD image quality means precise on-screen image reproduction of the original subject or object. To achieve precise image reproduction, the LCD module as a total package with optimally combined LCD panel, backlight system and peripheral circuitry is important.

Two absolute essentials in reproducing richly colored natural images are wide color reproduction range and smooth gray scale reproduction. Both are NEC LCD Technologies specialties — precisely why our LCDs feature the same wide color reproduction range as sRGB*1. The key is finding the optimum combination of color filters and backlight systems based on the kind of high transmissivity only our SFT technology can offer. We also feature products that support Adobe® RGB's*2 wide color gamut through the use of RGB3 primary color LEDs in the backlights.

A multi-bit driver, customizable internal LUT*3 and other advanced components are the keys to high color separation and smooth gray scale reproduction using this wide color gamut. Such cutting-edge quality ensures optimum reproduction of any and all images down to the finest details — from the delicate nuances of natural tones to the subtle gradation changes of medical imaging data.

*1 sRGB: International standards on color space established by IEC (International Electrotechnical Commission).
*2 "Adobe" is a registered trademark or trademark of Adobe Systems Incorporated.
*3 LUT: Look Up Table

CIE XYZ colorimetric system (CIE 1931) chromaticity diagram



*4 NL160120BC27-10 (SA-SFT+LED B/L), Color gamut: 103% of NTCS ratio, Luminance: 250cd/m²
*5 NL160120BC27-14 (SA-SFT+CCFL B/L), Color gamut: 72% of NTCS ratio, Luminance: 250cd/m²

21.3-inch LCD module equipped with a RGB3 LED backlight system

NL160120BC27-10

103%

22.5-inch LCD module equipped with 10 bit driver

NL192120AC25-02

10 bit

97%

SFT, NLT and VIT are abbreviations, respectively, for Super Fine TFT, Natural Light TFT and Value Integrated TFT.

Our latest selection of high-performance displays

High definition · Display colors · Wide color gamut (NTSC ratio) · Long-life white LED · White LED · High intensity backlight · High luminance · High contrast · Ultra-wide viewing angle · Wide viewing angle · Wide operating-temperature range · Wide

For industrial use

12.1 – inch
Long-life white LED backlight model
- NL8060BC31-47D
（12.1-inch SVGA）

This model incorporates a newly-designed LED unit that achieves both long operating life* and low power consumption in its backlight system. This is a next- generation standard model for industrial use.
* 25˚C : 70,000H, 70˚C : 60,000H

16.77M/262K colors · LED · 400cd/m² · 600:1 · (h) 160˚ (v) 140˚ · -20˚C~+70˚C

10.4 – inch ST-NLT
Ambient light adaptive model
- NL8060BC26-30C
（10.4-inch SVGA）

ST-NLT technology enables high visibility, high luminance and vivid colors in the bright sunlight.

16.77M/262K colors · 550cd/m² · 900:1 · (h) 160˚ (v) 160˚ · -20˚C~+70˚C

10.4 – inch
Long-life white LED backlight model
- NL6448BC33-71D
（10.4-inch VGA）

This model incorporates a newly-designed LED unit that achieves both long operating life* and low power consumption in its backlight system. This is a next- generation standard model for industrial use.
* 25˚C : 70,000H, 70˚C : 60,000H

16.77M/262K colors · LED · 450cd/m² · 600:1 · (h) 160˚ (v) 140˚ · -20˚C~+70˚C

9.0 – inch UA-SFT
Ultra-wide viewing angle model
- NL8048BC24-04
（9.0-inch WVGA）

UA-SFT technology enables ultra-wide viewing angle and high contrast ratio. This model supports a wide 800 x 480 pixel format.

16.77M/262K colors · 800:1 · (h) 176˚ (v) 176˚ · -20˚C~+70˚C · WIDE

9.0 – inch
Long-life white LED backlight model
- NL8048BC24-06
（9.0-inch WVGA）

This model incorporates a newly-designed LED unit that achieves both long operating life* and low power consumption in its backlight system and supports a wide 800 x 480 pixel format.
* 25˚C : 70,000H, 70˚C : 60,000H

16.77M/262K colors · LED · 400cd/m² · 600:1 · (h) 160˚ (v) 140˚ · -20˚C~+70˚C · WIDE

8.4 – inch
Long-life white LED backlight model
- NL6448BC26-26
（8.4-inch VGA）

This model incorporates a newly-designed LED unit that achieves both long operating life* and low power consumption in its backlight system. This is a next- generation standard model for industrial use.
* 25˚C : 70,000H, 70˚C : 60,000H

LED · 450cd/m² · 600:1 · (h) 160˚ (v) 140˚ · -20˚C~+70˚C

7.0 – inch
Long-life white LED backlight model
- NL8048BC19-08
（7.0-inch WVGA）

This model incorporates a newly-designed LED unit that achieves both long operating life* and low power consumption in its backlight system and supports a wide 800 x 480 pixel format.
* 25˚C : 70,000H, 70˚C : 60,000H

16.77M/262K colors · LED · 400cd/m² · 1000:1 · (h) 160˚ (v) 160˚ · -20˚C~+70˚C · WIDE

5.7 – inch
White LED backlight and high luminance model
- NL6448BC18-01F
（5.7-inch VGA）

This model achieves a slim body and low power consumption due to the white LED backlight system and also enables high visibility with its high luminance and high contrast ratio.

LED · 800cd/m² · 1000:1 · (h) 160˚ (v) 160˚ · -20˚C~+70˚C

5.7 – inch
White LED backlight model
- NL6448BC18-01
（5.7-inch VGA）

This model has a slim body and low power consumption due to the white LED backlight system.

LED · 400cd/m² · 1000:1 · (h) 160˚ (v) 160˚ · -20˚C~+70˚C

White LED Backlight System

White LED backlight systems have been gaining acceptance in industrial display applications.
Some of the key characteristics of LED backlights are:

- ◆ low power consumption, slim package and lightweight design compared to cold-cathode fluorescent lamp (CCFL) backlight systems.
- ◆ high resistance to shock and vibration compared to CCFL backlight systems.
- ◆ reduced concern about peripheral equipment malfunctions and the integrity of measurement results that can be affected by harmonic currents and high-frequency noise.
- ◆ greater control of the backlight in response to ambient light makes it is easier to modulate light and dimming range as compared with CCFL backlight systems.
- ◆ the influence of low temperatures are minimized so that luminance and start up performance are better than with CCFL backlights.
- ◆ LED backlights are completely mercury-free and therefore less harmful to the environment than CCFLs.

By leveraging the above LED characteristics, NEC LCD Technologies has been able to expand its diverse product line-up with high-reliability LCDs that achieve **long operating life**, **low power consumption** and **slim designs**. These products are ideally suited for a variety of portable industrial equipment applications. Through on-going product development we will continue to expand our white LED backlight product line-up.

Lineup of white LED backlight models for industrial use.

	15.0"	12.1"	10.4"	9.0"W	8.4"	7.0"W	6.5"	5.7"
XGA	○	○	○				●	
SVGA		●	○		○			
VGA / WVGA			●	●	●	●	●	●

● : New Product ● : Mass Production ○ : Under Planning

Products equipped with white LED backlight system for industrial use

12.1-inch	NL8060BC31-47D NEW	6.5-inch	NL10276BC13-01C
10.4-inch	NL6448BC33-71D NEW		NL10276BC13-01
9.0-inch	NL8048BC24-06 NEW		NL6448BC20-21C
8.4-inch	NL6448BC26-26 NEW		NL6448BC20-21D
7.0-inch	NL8048BC19-08 NEW	5.7-inch	NL6448BC18-01F NEW
			NL6448BC18-01 NEW

For monitor use

21.3 – inch UA-SFT
2M-pixel high luminance color model
- NL160120AC27-22B
（21.3-inch UXGA）

Although this is a color model, it achieves ultra-high luminance and high contrast ratio of 1100:1 that can support medical diagnosis by radiograph interpretation, using UA-SFT technology with a high-intensity backlight system.

2M pixels · 16.77M colors · 72% · 900cd/m² · 1100:1 · (h) 176˚ (v) 176˚

20.1 – inch SA-SFT
5M-pixel monochrome model
- NL256204AM15-03A
（20.1-inch QSXGA）

This model can support medical diagnosis of digital mammographic images due to its wide viewing angle with SA-SFT technology and 5 mega pixel of ultra-high density display.

5M pixels · 850cd/m² · 600:1 · (h) 176˚ (v) 176˚

※For product availability, please contact our sales offices or our agents.
◆ST-NLT : Super-Transmissive NLT、UA-SFT : Ultra-Advanced SFT、SA-SFT : Super-Advanced SFT

We provide the optimum solutions that meet diverse customer requirements.

Industrial Applications


Ticket machines


POS terminals


Factory automation controllers


Measuring equipment


ATMs


PPC multifunctional devices

High-End Professional Applications


Medical equipment


Broadcasting equipment

Mobile Applications


PNDs


Handheld terminals


PDAs

For mobile use

Product Map

※All of LCD modules for mobile use are equipped with a timing controller and a DC/DC converter.

Viewing Direction			4.3 inch Wide Landscape	4.1 inch Wide Landscape	3.5 inch Portrait	2.7 inch Wide Landscape	2.7 inch Portrait
QHD 960×540	Transmissive	Without touch panel				NL9654HL06-01J VIT WIDE 70% 300cd/m²	
WVGA 800×480	Transmissive	With touch panel		NL8048HL11-01B VIT WIDE 70% 350cd/m²			
VGA 480×640	NLT	With touch panel			NL4864HL11-01B VIT SR-NLT 200cd/m² (transmissive mode)		
		Without touch panel			NL4864HL11-02A VIT SR-NLT 220cd/m² (transmissive mode)		
WQVGA 480×272	Transmissive	With touch panel	NL4827HC19-05B WIDE 500cd/m²				
		Without touch panel	NL4827HC19-05A WIDE 600cd/m²				
QVGA 240×320	NLT	With touch panel			NL2432HC22-41B SR-NLT 200cd/m² (transmissive mode)		NL2432HC17-04B SR-NLT 120cd/m² (transmissive mode)
		Without touch panel			NL2432HC22-40A SR-NLT 220cd/m² (transmissive mode)		NL2432HC17-04A SR-NLT 140cd/m² (transmissive mode)
	Transmissive	With touch panel					NL2432HC17-07B 500cd/m²
		Without touch panel					NL2432HC17-07A 550cd/m²

Product Specifications

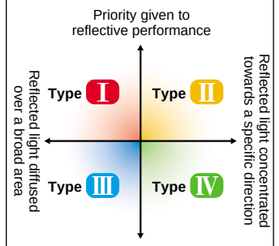
NTSC ratio ···Wide color gamut ··· Touch panel WIDE ···Wide

Screen Size	4.3 inch Wide (11cm diagonal)		4.1 inch Wide (10.4cm diagonal)	3.5 inch (8.9cm diagonal)			
Viewing Direction	Landscape		Landscape	Portrait			
Part Number	NL4827HC19-05B	NL4827HC19-05A	NL8048HL11-01B	NL4864HL11-01B	NL4864HL11-02A	NL2432HC22-41B	NL2432HC22-40A
Resolution	480 × 272	480 × 272	800 × 480	480 × 640	480 × 640	240 × 320	240 × 320
Display Area (mm)	95.04 × 53.856	95.04 × 53.856	88.80 × 53.28	53.28 × 71.04	53.28 × 71.04	53.64 × 71.52	53.64 × 71.52
Display Color	16.77M colors	16.77M colors	16.77M colors	262K colors	262K colors	262K colors	262K colors
Pixel Pitch (mm)	0.198 × 0.198	0.198 × 0.198	0.111 × 0.111	0.111 × 0.111	0.111 × 0.111	0.2235 × 0.2235	0.2235 × 0.2235
Reflectivity	—	—	—	7%(including touch panel) Type III	7% Type III	15%(including touch panel) Type IV	15% Type IV
Luminance	500cd/m² ※at IL=20mA	600cd/m² ※at IL=20mA	350cd/m² ※at IL=14mA	200cd/m² ※at IL=20mA*2	220cd/m² ※at IL=20mA*2	200cd/m² ※at IL=20mA*2	220cd/m² ※at IL=20mA*2
Contrast Ratio	500：1	500：1	400：1	180：1*2	180：1*2	150：1*2	150：1*2
Viewing Angle (Up,Down,Left,Right)	60°, 80°, 80°, 80° Contrast Ratio ≧ 10:1	60°, 80°, 80°, 80° Contrast Ratio ≧ 10:1	60°, 80°, 80°, 80° Contrast Ratio ≧ 10:1	30°, 35°, 30°, 30°*2 Contrast Ratio ≧ 5:1	30°, 35°, 30°, 30°*2 Contrast Ratio ≧ 5:1	30°, 35°, 30°, 30°*2 Contrast Ratio ≧ 5:1	35°, 35°, 35°, 35°*2 Contrast Ratio ≧ 5:1
Response Time*1	33ms	33ms	25ms	30ms	30ms	30ms	30ms
Interface	CMOS(RGB 8 bits each)	CMOS(RGB 8 bits each)	CMOS(RGB 8 bits each)	CMOS(RGB 6 bits each)	CMOS(RGB 6 bits each)	CMOS(RGB 6 bits each)	CMOS(RGB 6 bits each)
Power Supply Voltage	VCC：3.0V VDD：5.0V	VCC：3.0V VDD：5.0V	VCC：3.0V	VCC：3.0V	VCC：3.0V	VCC：3.0V	VCC：3.0V
Power Cons. LCD Panel+Driver	87mW	87mW	165mW	120mW	120mW	50mW	50mW
Power Cons. Backlight	512mW ※at IL=20mA	512mW ※at IL=20mA	604mW ※at IL=14mA	512mW ※at IL=20mA	512mW ※at IL=20mA	384mW ※at IL=20mA	384mW ※at IL=20mA
Operating Temperature	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃
Storage Temperature	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃
Surface Condition	Antiglare	Clear	Clear	Clear	Clear	Clear	Clear
Module Size W × H × Dmm (D：max*3)	105.5 × 67.2 × 5.1	105.5 × 67.2 × 4.1	99.6 × 69.5 × 5.2	63.5 × 85.0 × 4.4	63.5 × 85.0 × (3.2)	63.5 × 85.0 × 4.4	63.5 × 85.0 × 3.2
Weight	72g	58g	70g	43g	(25g)	43g	25g
Reverse Scan	—	—	○*4	○*4	○*4	—	—
Touch Panel	Equipment	None	Equipment	Equipment	None	Equipment	None
Controller	Installed	Installed	Installed	Installed	Installed	Installed	Installed
Remarks	WIDE	WIDE	VIT WIDE 70%	VIT SR-NLT	VIT SR-NLT	SR-NLT	SR-NLT

Screen Size	2.7 inch Wide (6.8cm diagonal)	2.7 inch (6.8cm diagonal)			
Viewing Direction	Landscape	Portrait			
Part Number	NL9654HL06-01J	NL2432HC17-04B	NL2432HC17-04A	NL2432HC17-07B	NL2432HC17-07A
Resolution	960 × 540	240 × 320	240 × 320	240 × 320	240 × 320
Display Area (mm)	59.04 × 33.21	41.04 × 54.72	41.04 × 54.72	41.04 × 54.72	41.04 × 54.72
Display Color	16.77M colors	262K colors	262K colors	262K colors	262K colors
Pixel Pitch (mm)	0.0615 × 0.0615	0.171 × 0.171	0.171 × 0.171	0.171 × 0.171	0.171 × 0.171
Reflectivity	—	35%(including touch panel) Type II	35% Type II	—	—
Luminance	300cd/m² ※at IL=14mA	120cd/m² ※at IL=20mA*2	140cd/m² ※at IL=20mA*2	500cd/m² ※at IL=18mA	550cd/m² ※at IL=18mA
Contrast Ratio	400：1	150：1*2	150：1*2	400：1	400：1
Viewing Angle (Up,Down,Left,Right)	60°, 60°, 80°, 80° Contrast Ratio ≧ 10:1	35°, 30°, 30°, 30°*2 Contrast Ratio ≧ 5:1	35°, 30°, 30°, 30°*2 Contrast Ratio ≧ 5:1	60°, 30°, 50°, 50° Contrast Ratio ≧ 5:1	60°, 30°, 50°, 50° Contrast Ratio ≧ 5:1
Response Time*1	25ms	30ms	30ms	23ms	23ms
Interface	CMOS(RGB 8 bits each)	CMOS(RGB 6 bits each)	CMOS(RGB 6 bits each)	CMOS(RGB 6 bits each)	CMOS(RGB 6 bits each)
Power Supply Voltage	VCC：(2.7V) VDD：(6.5V)	VCC：3.0V	VCC：3.0V	VCC：3.0V	VCC：3.0V
Power Cons. LCD Panel+Driver	235mW	45mW	45mW	36mW	36mW
Power Cons. Backlight	518mW ※at IL=14mA	256mW ※at IL=20mA	256mW ※at IL=20mA	288mW ※at IL=18mA	288mW ※at IL=18mA
Operating Temperature	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃
Storage Temperature	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃
Surface Condition	Clear	Clear	Clear	Clear	Clear
Module Size W × H × Dmm (D：max*3)	69.0 × 50.8 × 3.6	50.54 × 68.62 × 4.32	50.54 × 68.62 × 3.2	50.54 × 68.62 × 3.75	50.54 × 68.62 × 2.8
Weight	26g	28g	23g	25g	19g
Reverse Scan	○*4	—	—	—	—
Touch Panel	None	Equipment	None	Equipment	None
Controller	Installed	Installed	Installed	Installed	Installed
Remarks	VIT WIDE 70%	SR-NLT	SR-NLT		—

4 selectable types of products featuring SR-NLT technology

The 4 types of products featuring SR-NLT technology are categorized by reflective mode. Select the product best suited to your application and usage environment.



※Please see the Data Sheet for detailed specifications. All values are typical values (excluding the width for module size). Values in brackets are tentative. *1 Values equal Ton + Toff (10%←→90%).
*2 In transmissive mode. *3 Values do not include protruding parts. *4 Both horizontal and vertical scan direction can be selected independently. ◆ VIT : Value Integrated TFT , SR-NLT : Super-Reflective NLT

For industrial use

Product Map

※ Mounting compatibility: Outer dimensions (except thickness), position of mounting holes and relative to screen center.
※ Interface compatibility: Interface connector pin assignment.

NTSC ratio ··· Wide color gamut
LED ··· Long-life white LED backlight
LED ··· White LED backlight
Wide operating-temperature range
WIDE ··· Wide

15.3 inch Wide	15.0 inch	12.1 inch	10.4 inch	9.0 inch Wide	8.4 inch	7.0 inch Wide	6.5 inch	5.7 inch	5.5 inch

WXGA 1280×768 LVDS SFT

WXGA Interface Compatibility (LVDS)*1

- NL12876BC26-25/25B — SA-SFT 470cd/m² — -30℃~+70℃ — WIDE

XGA 1024×768 LVDS

XGA Interface Compatibility (LVDS)*1

SFT
- NL10276BC30-17 — UA-SFT 350cd/m² — 72% — -30℃~+70℃

NLT
- NL10276BC30-18C — ST-NLT 600cd/m² — -30℃~+70℃

Wide viewing angle type
- NL10276BC30-18 — 500cd/m² — -30℃~+70℃
- NL10276BC30-33D — 400cd/m² — -30℃~+70℃
- NL10276BC30-32D — 250cd/m² — -30℃~+70℃

XGA Interface Compatibility (LVDS)*2

SFT
- NL10276BC16-01 — UA-SFT 400cd/m² — 72%

NLT
- NL10276BC24-13C — ST-NLT 400cd/m² — -30℃~+70℃
- NL10276BC13-01C — ST-NLT 650cd/m² — LED — -30℃~+70℃

Wide viewing angle type
- NL10276BC24-13 — 400cd/m² — -30℃~+70℃
- NL10276BC20-04 — 300cd/m²
- NL10276BC13-01 — 500cd/m² — LED — -30℃~+70℃

SVGA 800×600 LVDS

SVGA Interface Compatibility (LVDS)*2

SFT
- NL8060BC26-28 — SA-SFT 400cd/m² — -30℃~+70℃

NLT
- NL8060BC31-41C — ST-NLT 550cd/m² — -30℃~+70℃
- NL8060BC26-30C — NEW — ST-NLT 550cd/m² — -30℃~+70℃
- NL8060BC21-03 — ST-NLT 650cd/m² — -30℃~+70℃

Wide viewing angle type
- NL8060BC31-47D — NEW — (400cd/m²) — LED — -30℃~+70℃
- NL8060BC26-30D — 400cd/m² — -30℃~+70℃
- NL8060BC21-06 — 650cd/m² — -30℃~+70℃
- NL8060BC31-41D — 400cd/m² — -30℃~+70℃
- NL8060BC21-02 — 400cd/m² — -30℃~+70℃

SVGA 800×600 CMOS

SVGA Interface Compatibility (CMOS)

SFT
- NL8060BC31-20 — A-SFT 250cd/m²
- NL8060BC26-27 — SA-SFT 400cd/m² — -30℃~+70℃

Wide viewing angle type
- NL8060BC31-36*3 — 1100cd/m² — -10℃~+70℃
- NL8060BC31-42/42D — 400cd/m² — -30℃~+70℃
- NL8060BC21-04 — 400cd/m² — -20℃~+70℃

WVGA 800×480 LVDS

WVGA Interface Compatibility (LVDS)*2

SFT
- NL8048BC24-04 — NEW — UA-SFT 350cd/m² — -30℃~+70℃ — WIDE

Wide viewing angle type
- NL8048BC24-06 — NEW — (400cd/m²) — LED — -30℃~+70℃ — WIDE
- NL8048BC19-08 — NEW — 400cd/m² — LED — -30℃~+70℃ — WIDE
- NL8048BC24-01 — 400cd/m² — -30℃~+70℃ — WIDE

VGA 640×480 LVDS

VGA Interface Compatibility (LVDS)*2

SFT
- NL6448BC26-08D — UA-SFT 400cd/m² — 72%Min. — -10℃~+70℃

NLT
- NL6448BC33-63C — ST-NLT 450cd/m² — -30℃~+70℃
- NL6448BC20-21C — ST-NLT 800cd/m² — LED — -30℃~+70℃

Wide viewing angle type
- NL6448BC33-71D — NEW — (450cd/m²) — LED — -30℃~+70℃
- NL6448BC26-15 — 450cd/m² — -20℃~+70℃
- NL6448BC20-21D — 550cd/m² — LED — -30℃~+70℃
- NL6448BC33-63D — 450cd/m² — -30℃~+70℃

VGA 640×480 CMOS

VGA Interface Compatibility (CMOS)

SFT
- NL6448BC33-74 — SA-SFT 450cd/m² — -30℃~+70℃

NLT
- NL6448BC33-64C — ST-NLT 450cd/m² — -30℃~+70℃
- NL6448BC26-09C — ST-NLT 750cd/m² — -30℃~+70℃
- NL6448BC20-20 — ST-NLT 650cd/m² — -30℃~+70℃

Wide viewing angle type
- NL6448BC33-64 — 450cd/m² — -30℃~+70℃
- NL6448BC26-26 — NEW — (450cd/m²) — LED — -30℃~+70℃
- NL6448BC20-18D — 400cd/m² — -10℃~+70℃

Standard type
- NL6448BC33-54 — 220cd/m² — -10℃~+70℃
- NL6448BC26-09/09D — 450cd/m² — -20℃~+70℃

VGA Interface Compatibility (CMOS)
- NL6448BC18-01F — NEW — 800cd/m² — LED — -20℃~+70℃
- NL6448BC18-01 — NEW — 400cd/m² — LED — -20℃~+70℃

WQVGA 480×234 CMOS

WQVGA (CMOS)

Wide viewing angle type
- NL4823BC37-05 — 400cd/m² — -20℃~+70℃ — WIDE

QVGA 320×240 CMOS

QVGA Interface Compatibility (CMOS)

NLT
- NL3224BC35-22 — ST-NLT 750cd/m² — -10℃~+70℃

Wide viewing angle type
- NL3224BC35-20 — 400cd/m² — -10℃~+70℃

Mounting Compatibility

※Please see the Data Sheet for detailed specifications. All values are typical values (excluding the width for module size). Values in brackets are tentative.
◆A-SFT : Advanced SFT, SA-SFT : Super-Advanced SFT, UA-SFT : Ultra-Advanced SFT, ST-NLT : Super-Transmissive NLT

*1 The interface of 15.0-inch or larger LVDS models and 12.1-inch or smaller LVDS models are incompatible. *2 Connector types and connector pin alignments are compatible. Control signal is upwardly compatible.
*3 The position of the mounting holes with respect to the position of the display screen are interchangeable with other 12.1-inch models.

Product Specifications

NTSC ratio ···Wide color gamut　LED ···Long-life white LED backlight　···Wide operating-temperature range　WIDE ···Wide

Screen Size	15.3 inch Wide (39cm diagonal)	15.0 inch (38cm diagonal)					12.1 inch (31cm diagonal)						
Part Number	NL12876BC26-25/25B	NL10276BC30-17	NL10276BC30-18C	NL10276BC30-18	NL10276BC30-33D	NL10276BC30-32D	NL10276BC24-13C	NL10276BC24-13	NL8060BC31-41C	NL8060BC31-47D NEW	NL8060BC31-41D	NL8060BC31-20	NL8060BC31-42/42D
Resolution	1280 × 768	1024 × 768	1024 × 768	1024 × 768	1024 × 768	1024 × 768	1024 × 768	1024 × 768	800 × 600	800 × 600	800 × 600	800 × 600	800 × 600
Display Area (mm)	334.08 × 200.45	304.128 × 228.096	304.128 × 228.096	304.128 × 228.096	304.128 × 228.096	304.128 × 228.096	245.76 × 184.32	245.76 × 184.32	246.0 × 184.5	246.0 × 184.5	246.0 × 184.5	246.0 × 184.5	246.0 × 184.5
Display Color	16.77M colors	16.77M colors	16.77M colors	16.77M colors	16.77M colors	16.77M colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	262K colors	262K colors
Pixel Pitch (mm)	0.261 × 0.261	0.297 × 0.297	0.297 × 0.297	0.297 × 0.297	0.297 × 0.297	0.297 × 0.297	0.24 × 0.24	0.24 × 0.24	0.3075 × 0.3075	0.3075 × 0.3075	0.3075 × 0.3075	0.3075 × 0.3075	0.3075 × 0.3075
Luminance	470cd/m²	350cd/m²	600cd/m²	500cd/m²	400cd/m²	250cd/m²	400cd/m²	400cd/m²	550cd/m²	(400cd/m²)	400cd/m²	250cd/m²	400cd/m²
Contrast Ratio	700：1	700：1	600：1	500：1	500：1	500：1	600：1	600：1	600：1	600：1	600：1	400：1	600：1
Viewing Angle (Up,Down,Left,Right) Contrast Ratio ≧10:1	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 80°, 80°, 80°	80°, 80°, 80°, 80°	45°, 55°, 70°, 70°	45°, 55°, 70°, 70°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	88°, 88°, 88°, 88°	80°, 60°, 80°, 80°
Response Time*1	25ms	25ms	18ms	18ms	18ms	18ms	33ms	33ms	25ms	25ms	25ms	80ms	25ms
Interface	LVDS (RGB 8 bits each)	LVDS (RGB 8 bits each)	LVDS (RGB 8 bits each)	LVDS (RGB 8 bits each)	LVDS (RGB 8 bits each)	LVDS (RGB 8 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)
Power Supply Voltage	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V / 5.0V	3.3V / 5.0V
Power Consumption	18.0W*2	16.6W*2	15.7W*2	15.7W*2	10.0W*2	10.0W*2	7.0W*2	7.0W*2	6.8W*2	(5.3W)	6.8W*2	7.0W*2	6.9W*2
Operating Temperature	−10℃ ～ +70℃	0℃ ～ +55℃	−10℃ ～ +70℃	−10℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−10℃ ～ +70℃	−10℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	0℃ ～ +55℃	−20℃ ～ +70℃
Storage Temperature	−20℃ ～ +80℃	−20℃ ～ +60℃	−20℃ ～ +80℃	−20℃ ～ +80℃	−20℃ ～ +80℃	−20℃ ～ +80℃	−20℃ ～ +80℃	−20℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−20℃ ～ +60℃	−30℃ ～ +80℃
Polarizer Surface	-25：Antiglare / -25B：Clear	Antiglare	Clear ＋ Antireflection	Antiglare	Antiglare	Antiglare	Clear ＋ Antireflection	Clear	Clear ＋ Antireflection	Antiglare	Antiglare	Clear	-42：Clear / -42D：Antiglare
Module Size W × H × Dmm (D：max)	358.0 × 226.0 × 16.8	326.5 × 253.5 × 17.0	326.5 × 253.5 × 17.0	326.5 × 253.5 × 17.0	326.5 × 253.5 × 12.0	326.5 × 253.5 × 12.0	280.0 × 210.0 × 13.7	280.0 × 210.0 × 13.7	280.0 × 210.0 × 11.5	280.0 × 210.0 × 11.5	280.0 × 210.0 × 11.5	280.0 × 210.0 × 13.7	280.0 × 210.0 × 11.5
Weight	1270g	1300g	1300g	1300g	970g	970g	755g	750g	670g	(670g)	670g	760g	670g
Reverse Scan	—	—	○	○	○	○	○	○	○	○	○	○	○
Backlight	Top and bottom, 2 CCFLs each	Top and bottom, 2 CCFLs each	Top and bottom, 2 CCFLs each	Top and bottom, 2 CCFLs each	Top and bottom, 1 CCFL each	Top and bottom, 1 CCFL each	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	White LED	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs
Recommended Inverter	—	150PW231	150PW231	150PW231	150PW331	150PW331	121PW181	121PW181	121PW181	—	121PW181	121PW161	121PW181
Remarks	SA-SFT WIDE	UA-SFT 72%	ST-NLT	—	—	—	ST-NLT	—	ST-NLT	LED	—	A-SFT	—

Screen Size	12.1 inch (31cm diagonal)	10.4 inch (26cm diagonal)										
Part Number	NL8060BC31-36	NL10276BC20-04	NL8060BC26-28	NL8060BC26-30C NEW	NL8060BC26-30D	NL8060BC26-27	NL6448BC33-63C	NL6448BC33-71D NEW	NL6448BC33-63D	NL6448BC33-74	NL6448BC33-64C	NL6448BC33-64	NL6448BC33-54
Resolution	800 × 600	1024 × 768	800 × 600	800 × 600	800 × 600	800 × 600	640 × 480	640 × 480	640 × 480	640 × 480	640 × 480	640 × 480	640 × 480
Display Area (mm)	246.0 × 184.5	210.4 × 157.8	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4	211.2 × 158.4
Display Color	262K colors	262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	262K colors	262K colors	262K colors	262K colors
Pixel Pitch (mm)	0.3075 × 0.3075	0.2055 × 0.2055	0.264 × 0.264	0.264 × 0.264	0.264 × 0.264	0.264 × 0.264	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33	0.33 × 0.33
Luminance	1100cd/m²	300cd/m²	400cd/m²	550cd/m²	400cd/m²	400cd/m²	450cd/m²	(450cd/m²)	450cd/m²	450cd/m²	450cd/m²	450cd/m²	220cd/m²
Contrast Ratio	600：1	300：1	700：1	900：1	1000：1	700：1	600：1	600：1	600：1	800：1	600：1	600：1	350：1
Viewing Angle (Up,Down,Left,Right) Contrast Ratio ≧10:1	45°, 55°, 70°, 70°	45°, 60°, 60°, 60°	88°, 88°, 88°, 88°	80°, 80°, 80°, 80°	80°, 80°, 80°, 80°	88°, 88°, 88°, 88°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	88°, 88°, 88°, 88°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	30°, 20°, 45°, 45°
Response Time*1	33ms	55ms	50ms	18ms	18ms	50ms	25ms	25ms	25ms	30ms	25ms	25ms	38ms
Interface	CMOS (RGB 6 bits each)	LVDS (RGB 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	CMOS (RGB 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)
Power Supply Voltage	3.3V / 5.0V	3.3V	3.3V	3.3V	3.3V	3.3V / 5.0V	3.3V	3.3V	3.3V	3.3V / 5.0V	3.3V / 5.0V	3.3V / 5.0V	3.3V / 5.0V
Power Consumption	13.7W*2	6.2W*2	6.5W*2	6.6W*2	6.6W*2	6.6W*2	6.2W*2	(4.6W)	6.2W*2	6.6W*2	6.2W*2	6.2W*2	5.8W*2
Operating Temperature	−10℃ ～ +70℃	0℃ ～ +60℃	−10℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−10℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−10℃ ～ +70℃
Storage Temperature	−20℃ ～ +80℃	−20℃ ～ +70℃	−20℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−20℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−20℃ ～ +80℃
Polarizer Surface	Clear	Clear	Clear	Clear ＋ Antireflection	Antiglare	Clear	Clear ＋ Antireflection	Antiglare	Antiglare	Clear	Clear ＋ Antireflection	Clear	Clear
Module Size W × H × Dmm (D：max)	280.0 × 209.0 × 17.0	243.0 × 185.1 × 11.5	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0	243.0 × 185.1 × 11.0
Weight	900g	530g	475g	475g	475g	475g	475g	(475g)	475g	475g	475g	475g	465g
Reverse Scan	○	○	○	○	○	○	○	○	○	○	○	○	○
Backlight	Top and bottom, 2 CCFLs each	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	White LED	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs
Recommended Inverter	—	104PW191	104PW201	104PW201	104PW201	104PW161	104PW201	—	104PW201	104PW201	104PW201	104PW201	104PW191 / 104PW161
Remarks	—	—	SA-SFT	ST-NLT	—	SA-SFT	ST-NLT	LED	—	SA-SFT	ST-NLT	—	—

※Please see the Data Sheet for detailed specifications. All values are typical values (excluding the width for module size). Values in brackets are tentative. *1 Values equal Ton + Toff (10%←→90%).
*2 Values do not include inverter power dissipation. ◆ A-SFT: Advanced SFT, SA-SFT: Super-Advanced SFT, UA-SFT: Ultra-Advanced SFT, ST-NLT: Super-Transmissive NLT

Product Specifications

NTSC ratio ···Wide color gamut　LED ···Long-life white LED backlight　LED ···White LED backlight　···Wide operating-temperature range　WIDE ···Wide

Screen Size	9.0 inch Wide (23cm diagonal)			8.4 inch (21cm diagonal)									
Part Number	NL8048BC24-04 NEW	NL8048BC24-06 NEW	NL8048BC24-01	NL10276BC16-01	NL8060BC21-03	NL8060BC21-06	NL8060BC21-02	NL8060BC21-04	NL6448BC26-08D	NL6448BC26-15	NL6448BC26-09C	NL6448BC26-26 NEW	NL6448BC26-09/09D
Resolution	800 × 480	800 × 480	800 × 480	1024 × 768	800 × 600	800 × 600	800 × 600	800 × 600	640 × 480	640 × 480	640 × 480	640 × 480	640 × 480
Display Area (mm)	196.8 × 118.08	196.8 × 118.08	196.8 × 118.08	170.496 × 127.872	170.4 × 127.8	170.4 × 127.8	170.4 × 127.8	170.4 × 127.8	170.88 × 128.16	170.88 × 128.16	170.88 × 128.16	170.88 × 128.16	170.88 × 128.16
Display Color	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	262K colors	262K colors	262K colors
Pixel Pitch (mm)	0.246 × 0.246	0.246 × 0.246	0.246 × 0.246	0.1665 × 0.1665	0.213 × 0.213	0.213 × 0.213	0.213 × 0.213	0.213 × 0.213	0.267 × 0.267	0.267 × 0.267	0.267 × 0.267	0.267 × 0.267	0.267 × 0.267
Luminance	350cd/m²	(400cd/m²)	400cd/m²	400cd/m²	650cd/m²	650cd/m²	400cd/m²	400cd/m²	400cd/m²	450cd/m²	750cd/m²	(450cd/m²)	450cd/m²
Contrast Ratio	800：1	600：1	600：1	400：1	600：1	600：1	600：1	600：1	800：1	600：1	600：1	600：1	600：1
Viewing Angle (Up,Down,Left,Right) Contrast Ratio ≧10:1	88°, 88°, 88°, 88°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	88°, 88°, 88°, 88°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	88°, 88°, 88°, 88°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°
Response Time*1	25ms	25ms	25ms	25ms	25ms	25ms	25ms	25ms	20ms	25ms	25ms	25ms	25ms
Interface	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	CMOS (RGB 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)
Power Supply Voltage	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V / 5.0V	3.3V	3.3V	3.3V / 5.0V	3.3V / 5.0V	3.3V / 5.0V
Power Consumption	5.8W*2	(4.6W)	5.8W*2	9.8W*2	5.5W*2	5.5W*2	5.5W*2	5.5W*2	5.4W*2	5.3W*2	5.3W*2	(3.5W)	5.3W*2
Operating Temperature	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	0℃ ～ +55℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−10℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃
Storage Temperature	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−20℃ ～ +60℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−20℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃
Polarizer Surface	Clear	Clear	Clear	Antiglare	Clear ＋ Antireflection	Clear	Clear	Clear	Antiglare	Clear	Clear ＋ Antireflection	Clear	-09：Clear / -09D：Antiglare
Module Size W × H × Dmm (D：max)	220.5 × 136.5 × 11.0	220.5 × 136.5 × 11.0	220.5 × 136.5 × 11.0	200.0 × 152.0 × 17.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0	200.0 × 152.0 × 11.0
Weight	365g	(365g)	365g	465g	330g	330g	330g	330g	330g	330g	330g	(330g)	330g
Reverse Scan	○	○	○	○	○	○	○	○	○	○	○	○	○
Backlight	One side, 2 CCFLs	White LED	One side, 2 CCFLs	Top and bottom, 2 CCFLs each	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	One side, 2 CCFLs	White LED	One side, 2 CCFLs
Recommended Inverter	104PW201	—	104PW201	84PW021	84PW031 / 84PW041	84PW031 / 84PW041	84PW031 / 84PW041	84PW031 / 84PW041	84PW031 / 84PW041	84PW031 / 84PW041	84PW031 / 84PW041	—	84PW031 / 84PW041
Remarks	UA-SFT WIDE	LED WIDE	WIDE	UA-SFT 72%	ST-NLT	—	—	—	UA-SFT 72%	—	ST-NLT	LED	—

Screen Size	7.0 inch Wide (18cm diagonal)		6.5 inch (17cm diagonal)						5.7 inch (15cm diagonal)		5.5 inch (14cm diagonal)	
Part Number	NL8048BC19-08 NEW	NL4823BC37-05	NL10276BC13-01C	NL10276BC13-01	NL6448BC20-21C	NL6448BC20-21D	NL6448BC20-20	NL6448BC20-18D	NL6448BC18-01F NEW	NL6448BC18-01 NEW	NL3224BC35-22	NL3224BC35-20
Resolution	800 × 480	480 × 234	1024 × 768	1024 × 768	640 × 480	640 × 480	640 × 480	640 × 480	640 × 480	640 × 480	320 × 240	320 × 240
Display Area (mm)	152.4 × 91.44	154.08 × 87.048	132.096 × 99.072	132.096 × 99.072	132.48 × 99.36	132.48 × 99.36	132.48 × 99.36	132.48 × 99.36	116.16 × 87.12	116.16 × 87.12	111.36 × 83.52	111.36 × 83.52
Display Color	16.77M colors / 262K colors	262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	16.77M colors / 262K colors	262K colors	262K colors	262K colors	262K colors	262K colors	262K colors
Pixel Pitch (mm)	0.1905 × 0.1905	0.321 × 0.372	0.129 × 0.129	0.129 × 0.129	0.207 × 0.207	0.207 × 0.207	0.207 × 0.207	0.207 × 0.207	0.1815 × 0.1815	0.1815 × 0.1815	0.348 × 0.348	0.348 × 0.348
Luminance	400cd/m²	400cd/m²	650cd/m²	500cd/m²	800cd/m²	550cd/m²	650cd/m²	400cd/m²	800cd/m²	400cd/m²	750cd/m²	400cd/m²
Contrast Ratio	1000：1	600：1	500：1	500：1	600：1	600：1	600：1	600：1	1000：1	1000：1	500：1	400：1
Viewing Angle (Up,Down,Left,Right) Contrast Ratio ≧10:1	80°, 80°, 80°, 80°	60°, 80°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 60°, 80°, 80°	80°, 80°, 80°, 80°	80°, 80°, 80°, 80°	50°, 40°, 55°, 55°	50°, 40°, 55°, 55°
Response Time*1	18ms	25ms	25ms	25ms	25ms	25ms	25ms	25ms	18ms	18ms	30ms	30ms
Interface	LVDS (RGB 8 bits each / 6 bits each)	CMOS (RGB 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	LVDS (RGB 8 bits each / 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)	CMOS (RGB 6 bits each)
Power Supply Voltage	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V	3.3V / 5.0V	3.3V / 5.0V	3.3V	3.3V	3.3V / 5.0V	3.3V / 5.0V
Power Consumption	(3.8W)	2.7W*2	3.9W	3.9W	2.4W	2.4W	4.4W*2	4.4W*2	3.3W	1.8W	3.8W*2	3.8W*2
Operating Temperature	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−10℃ ～ +70℃	−10℃ ～ +70℃	−20℃ ～ +70℃	−20℃ ～ +70℃	−10℃ ～ +70℃	−10℃ ～ +70℃
Storage Temperature	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−20℃ ～ +80℃	−20℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃	−30℃ ～ +80℃
Polarizer Surface	Clear	Clear	Clear ＋ Antireflection	Clear	Clear ＋ Antireflection	Antiglare	Clear ＋ Antireflection	Antiglare	Clear	Clear	Clear ＋ Antireflection	Antiglare
Module Size W × H × Dmm (D：max)	170.0 × 111.0 × 9.0	174.5 × 105.5 × 11.0	153.0 × 118.0 × 9.5	153.0 × 118.0 × 9.5	153.0 × 118.0 × 9.5	153.0 × 118.0 × 9.5	153.0 × 118.0 × 11.0	153.0 × 118.0 × 11.0	135.0 × 104.6 × 11.0	135.0 × 104.6 × 11.0	134.0 × 104.5 × 13.0	134.0 × 104.5 × 13.0
Weight	170g	205g	170g	170g	170g	165g	205g	205g	165g	160g	215g	210g
Reverse Scan	○	○	○	○	○	○	○	○	○*3	○*3	○*3	○*3
Backlight	White LED	One side, 1 CCFL	White LED	White LED	White LED	White LED	One side, 2 CCFLs	One side, 2 CCFLs	White LED	White LED	Top and bottom, 1 CCFL each	Top and bottom, 1 CCFL each
Recommended Inverter	—	70PW021	—	—	—	—	65PW061	65PW061	—	—	55PW131	55PW131
Remarks	LED WIDE	WIDE	ST-NLT LED	LED	ST-NLT LED	LED	ST-NLT	—	LED	LED	ST-NLT	—

※Please see the Data Sheet for detailed specifications. All values are typical values (excluding the width for module size). Values in brackets are tentative. *1 Values equal Ton + Toff (10%←→90%).
*2 Values do not include inverter power dissipation. *3 Both horizontal and vertical scan direction can be selected independently. ◆UA-SFT: Ultra-Advanced SFT, ST-NLT: Super-Transmissive NLT

For monitor use

Product Map

※ Mounting compatibility: Outer dimensions (except thickness), position of mounting holes and relative to screen center.
※ Interface compatibility: Interface connector pin assignment.

		22.5 inch Wide	21.3 inch	20.1 inch	19.0 inch
QSXGA 2560×2048 (5M pixels)	Monochrome model			NEW NL256204AM15-03A SA-SFT MONO 850cd/m², 600:1, 30ms	
QXGA 2048×1536 (3M pixels)	Color model		NL204153AC21-09 UA-SFT 72% 800cd/m², 750:1, 24ms NL204153BC21-02 SA-SFT 72% 235cd/m², 450:1, 23ms		
	Monochrome model		NL204153AM21-07A SA-SFT MONO 1450cd/m², 900:1, 27ms NL204153BM21-01/01A SA-SFT MONO 800cd/m², 700:1, 35ms		
WUXGA 1920x1200	Color model	NL192120AC25-02 UA-SFT 97% WIDE (420cd/m²), (800:1), (12ms)			
UXGA 1600×1200 (2M pixels)	Color model		NEW NL160120AC27-22B UA-SFT 72% (900cd/m²), (1100:1), (35ms) NL160120BC27-14 SA-SFT 72% 250cd/m², 550:1, 20ms NL160120BC27-10 SA-SFT 103% LED 250cd/m², 430:1, 20ms		
	Monochrome model		NL160120AM27-13A SA-SFT MONO 1650cd/m², 850:1, 23ms NL160120BM27-03/03A SA-SFT MONO 1000cd/m², 700:1, 35ms		
SXGA 1280×1024 (1M pixels)	Color model				NL128102BC29-10 UA-SFT 72% (300cd/m²),(800:1), 20ms
	Monochrome model				NL128102BM29-05A SA-SFT MONO 1000cd/m², 900:1, 35ms

Mounting Compatibility

ADY 2007 Won the 12th Advanced Display of the Year 2007 (ADY) award in the Display Module category.

Mounting Compatibility

Product Specifications

NTSC ratio …Wide color gamut　MONO …Monochrome model　LED …RGB (3 primary colors) LED backlight　…High intensity backlight　WIDE …Wide　…Refresh rate　…Multi-bit driver

Screen Size	22.5 inch Wide (57cm diagonal)	21.3 inch (54cm diagonal)					
Part Number	NL192120AC25-02	NL204153AC21-09	NL204153BC21-02	NL204153AM21-07A	NL204153BM21-01/01A	NL160120AC27-22B NEW	NL160120BC27-14
Resolution	1920 × 1200	2048 × 1536	2048 × 1536	2048 × 1536	2048 × 1536	1600 × 1200	1600 × 1200
Display Area (mm)	483.84 × 302.4	433.152 × 324.864	433.152 × 324.864	433.152 × 324.864	433.152 × 324.864	432.0 × 324.0	432.0 × 324.0
Display Color	1073M colors	16.77M colors	16.77M colors	256 gray scales / 1sub-pixel 766 gray scales / 1pixel	256 gray scales / 1sub-pixel 766 gray scales / 1pixel	16.77M colors	16.77M colors
Pixel Pitch (mm)	0.252 × 0.252	0.2115 × 0.2115	0.2115 × 0.2115	0.2115 × 0.2115	0.2115 × 0.2115	0.27 × 0.27	0.27 × 0.27
Luminance	(420cd/m²)	800cd/m²	235cd/m²	1450cd/m²	800cd/m²	(900cd/m²)	250cd/m²
Contrast Ratio	(800：1)	750：1	450：1	900：1	700：1	(1100：1)	550：1
Viewing Angle (Up,Down,Left,Right) Contrast Ratio ≧10:1	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°
Response Time*1	(12ms)	24ms	23ms	27ms	35ms	(35ms)	20ms
Interface	4port LVDS (RGB 10 bits each)	4port LVDS (RGB 8 bits each)	4port LVDS (RGB 8 bits each)	4port LVDS (LCR 8 bits each)	4port LVDS (LCR 8 bits each)	2port LVDS (RGB 8 bits each)	2port LVDS (RGB 8 bits each)
Power Supply Voltage	12.0V (Inverter：12.0V)	12.0V (Inverter：24.0V)	12.0V	12.0V (Inverter：12.0V)	12.0V	(12.0V) (Inverter：(24.0V))	12.0V
Power Consumption	(67.0W)	73.2W	32.5W*2	68.4W	34.2W*2	(72.0W)	30.7W*2
Operating Temperature	0℃ ～ +50℃	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃
Storage Temperature	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃
Polarizer Surface	Antiglare	Antiglare	Antiglare	Antiglare	Antiglare	Antiglare	Antiglare
Module Size W X H X Dmm (D: max)	542.0 × 362.0 × 55.5	457.0 × 350.0 × 37.0	457.0 × 350.0 × 25.5	457.0 × 350.0 × 37.0	457.0 × 350.0 × 25.5	457.0 × 350.0 × 37.0	457.0 × 350.0 × 25.5
Weight	3450g	2700g	3800g	3000g	3800g	2600g	3750g
Backlight	12 CCFLs	16 CCFLs	Top and bottom, 3 CCFLs each	16 CCFLs	Top and bottom, 3 CCFLs each	16 CCFLs	Top and bottom, 3 CCFLs each
Inverter	Built in	Built in	Not provided	Built in	Not provided	Built in	Not provided
Remarks	UA-SFT 97% WIDE 120Hz 10bit	UA-SFT 72%	SA-SFT 72%	SA-SFT MONO Clear base	SA-SFT MONO -01: Blue base -01A: Clear base	UA-SFT 72%	SA-SFT 72%

Screen Size	21.3 inch (54cm diagonal)			20.1 inch (51cm diagonal)	19.0 inch (48cm diagonal)	
Part Number	NL160120BC27-10	NL160120AM27-13A	NL160120BM27-03/03A	NL256204AM15-03A NEW	NL128102BC29-10	NL128102BM29-05A
Resolution	1600 × 1200	1600 × 1200	1600 × 1200	2560 × 2048	1280 × 1024	1280 × 1024
Display Area (mm)	432.0 × 324.0	432.0 × 324.0	432.0 × 324.0	399.36 × 319.488	376.32 × 301.056	376.32 × 301.056
Display Color	16.77M colors	256 gray scales/1sub-pixel 766 gray scales/1pixel	256 gray scales/1sub-pixel 766 gray scales/1pixel	256 gray scales/1sub-pixel 766 gray scales/1pixel	16.77M colors	256 gray scales/1sub-pixel 766 gray scales/1pixel
Pixel Pitch (mm)	0.27 × 0.27	0.27 × 0.27	0.27 × 0.27	0.156 × 0.156	0.294 × 0.294	0.294 × 0.294
Luminance	250cd/m²	1650cd/m²	1000cd/m²	850cd/m²	(300cd/m²)	1000cd/m²
Contrast Ratio	430：1	850：1	700：1	600：1	(800：1)	900：1
Viewing Angle (Up,Down,Left,Right) Contrast Ratio ≧10:1	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°	88°, 88°, 88°, 88°
Response Time*1	20ms	23ms	35ms	30ms	20ms	35ms
Interface	2port LVDS (RGB 8 bits each)	2port LVDS (LCR 8 bits each)	2port LVDS (LCR 8 bits each)	4port LVDS (LCR 8 bits each)	2port LVDS (RGB 8 bits each)	2port LVDS (LCR 8 bits each)
Power Supply Voltage	12.0V	12.0V (Inverter：12.0V)	12.0V	12.0V (Inverter：12.0V)	5.0V	5.0V
Power Consumption	72.0W (At 6,500K)	63.7W	30.7W*2	49.2W	(25.9W*2)	26.8W*2
Operating Temperature	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃	0℃ ～ +55℃
Storage Temperature	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃	−20℃ ～ +60℃
Polarizer Surface	Antiglare	Antiglare	Antiglare	Antiglare	Antiglare	Antiglare
Module Size W X H X Dmm (D: max)	457.0 × 355.0 × 47.4*3	457.0 × 350.0 × 37.0	457.0 × 350.0 × 25.5	423.4 × 343.5 × 44.5	404.2 × 330.0 × 22.3	404.2 × 330.0 × 22.3
Weight	TBD	2900g	3750g	2440g	(2700g)	2900g
Backlight	RGB (3 primary colors) LED array	16 CCFLs	Top and bottom, 3 CCFLs each	12 CCFLs	Top and bottom, 3 CCFLs each	Top and bottom, 3 CCFLs each
Inverter	Unnecessary	Built in	Not provided	Built in	Not provided	Not provided
Remarks	SA-SFT 103% Note: Adobe® RGB ratio Surface area: 109% Cover ratio: 98.3% LED	SA-SFT MONO Clear base	SA-SFT MONO -03: Blue base -03A: Clear base	SA-SFT MONO Clear base	UA-SFT 72%	SA-SFT MONO Clear base

※Please see the Data Sheet for detailed specifications. All values are typical values (excluding the width for module size). Values in brackets are tentative.
*1 Values equal Ton + Toff (10%←→90%). *2 Values do not include inverter power dissipation. *3 Value of depth is typical value. ◆SA-SFT: Advanced SFT, UA-SFT: Ultra-Advanced SFT