DIAGNOSTIC IMAGING

MultiSync® MD Series

21.3" grayscale medical-grade LCD monitors for diagnostic applications

NEC MULTISYNC MD SERIES The clear choice in diagnostic viewing.

NEC NEC Display Solutions

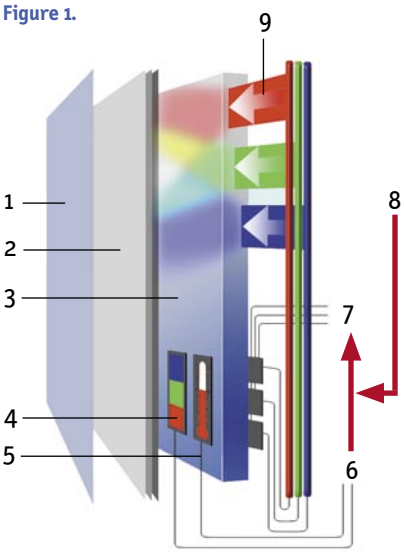
Modern medical technology enables complex examinations. But in the end, it is the radiologist who is responsible for fast and accurate diagnostic findings. To support these findings in a soft copy reading environment, flat-panel displays need to comply with the highest visual requirements. Their image quality has a decisive influence on diagnostic accuracy.

NEC Display Solutions is setting new standards with grayscale displays for filmless diagnostics, with technologies that are available for the first time in this market segment. This introduction of medical-grade displays is backed by years of experience in the development of TFT displays for professional use combined with intensive research done in the medical market.

MultiSync MD Series grayscale displays – in combination with the appropriate graphics controller – are designed for diagnostic imaging and for use in Picture Archiving and Communication System (PACS) applications. Furthermore, diagnostic imaging displays from NEC Di
areas of application and reduced service costs are just a few examples that contribute to cost reduction in healthcare.

Factory calibration and consistency. Using state-of-the-art equipment during production, each NEC MultiSync MD Series monitor is calibrated to the DICOM display function for luminance and to a desired white-point (color of the white) – whether for clear base or blue base. NEC Display Solutions' patent-pending X-Light™ technology (Fig. 1) has the unique ability to control and adjust the luminance and whitepoint via an integrated fast-feedback internal backlight sensor, which continuously monitors and realigns these settings to maintain the factory calibration throughout the life of the monitor. This helps to reduce* the need for frequent manual or network-based calibration.

Figure 1.



X-Light technology - a view behind the screen

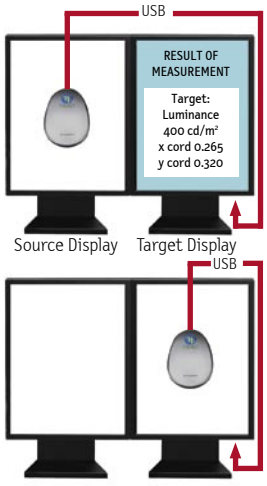
1 LCD panel
2 Polariser diffusing plate, etc.
3 Light guide plate
4 Color sensor
5 Temperature sensor
6 Current data of color sensor and temperature sensor
7 Control of 3 inverters
8 Calibration of whitepoint via pre-calibration in factory, software (GammaComp MD) or reference value of external sensor
9 Light sources, white light using a mixture of different phosphor colors

X-Light technology also alleviates the color shift of the backlight to the yellow spectrum, a common issue with competitive models. This benefit is achieved by keeping the whitepoint constant, while white light intensity remains the same. These two features are the basis for excellent diagnostic quality.

Monitor matching and reduced downtime. Another aspect of X-Light technology is its effective and efficient use in larger radiology departments and their IT infrastructure in hospitals. X-Light allows for easy multiple monitor matching – whether matching the whitepoints of two monitors or many monitors, the capability is virtually limitless. X-Light helps reduce service costs as it enables a more flexible use of display equipment. Since all X-Light-equipped monitors are set for the same whitepoint during production, they can be exchanged at any time within one location and swapped in existing dual- or multi-screen configurations. The commonly used method of manually screening displays for the appropriate matching whitepoint value and the need for an on-hand supply of "properly matched" exchange displays becomes an issue of the past. NEC MultiSync MD Series monitors have the ability to be matched to any other of their kind.

Standalone calibration and monitor matching. NEC MultiSync MD Series monitors have been designed to maintain their factory calibration. However, if calibration or matching (Fig. 2) to a replacement is required, the monitors can be configured using the built-in, standalone algorithm programmed into the monitor's firmware. This feature is useful for monitors that are not used in a setup where calibration can easily be performed with a PC and external software or non-supported operating systems.

Figure 2.



Display matching in the field

GammaComp™ MD calibration and conformance software. Quality control and calibration/matching can also be accomplished using GammaComp MD, ensuring consistent image quality on a single display system. The software maintains the monitor's conformance to the DICOM

standard, while providing an easy-to-use QA environment for medical imaging. Optionally, GammaComp MD Administrator provides centralized control and management of multiple display systems.

3061 shades of gray. The NEC MultiSync MD Series provides support for improved diagnostic accuracy with simultaneous reproduction of up to 1024 from a palette of 3061 possible grayscales. The programmable 10-bit gamma correction ensures precise and smooth grayscale tuning and better representation of just noticeable differences (JNDs). Up to 1024 grayscales can be depicted at the same time for filmless diagnosis.

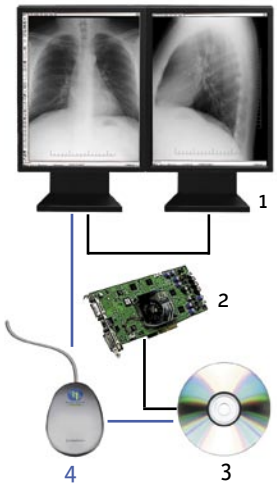
Figure 3. Attachable protective shield

Figure 4. Sentry^{DX} attachable remote network sensor

Of course, grayscale images based on the internationally accepted DICOM standard (256 grayscales) can be viewed as well. Fast, internal switching of the related look-up tables (LUTs) supports the display's usage for softcopy reading of images from different medical modalities.

SA Superfine TFT displays. The innovative SA Superfine TFT glass with 2- or 3-Megapixel resolution delivers a brilliant picture with a wide viewing angle of up to 176° and minimal off-angle color shift. Therefore, it provides the best conditions for several doctors doing consultation in front of the display.

Anti-glare and low reflection. The SA Superfine TFT glass utilizes round resin beads instead of inconsistently shaped silica gel within the glass substrates for advanced glare reduction. Additionally, a low reflection overcoat is applied on top of the bead layer, which yields a low, uniform reflection over the surface of the glass. This process also provides for a truer representation of black and a higher contrast ratio.



A typical NEC MultiSync MD Series display system configuration

1 Single or dual head displays
2 Display controller board
3 GammaComp MD quality control software
4 Calibrator (optional)

Ultra-thin-frame design. The dynamic cabinet design has become a trademark of NEC Display Solutions TFT displays. With a bezel width of only 16mm, they are perfectly suited to digital diagnostics systems in which two or more screens are positioned next to each other. The ultra-thin frame minimizes eye distraction during side-by-side image viewing.

Mutiple video card support. NEC MultiSync MD Series monitors work with 10-bit or 8-bit cards, however, 10-bit is recommended for optimum performance. 10-bit provides 1024 out of 3061 shades, while 8-bit provides only 256 out of 3061.

Internal power supply. The NEC MultiSync MD Series features an internal power supply. There is no brick to kick, therefore, ground or desk clutter from a clunky power supply is eliminated.

Optional accessories. To add further performance and convenience, two accessories are available for the NEC MultiSync MD Series.

Protective shield. As these displays are often used by diagnostic professionals for illustration purposes, it is common for them to encounter frequent contact from fingers, pointers and pens. To help protect against LCD screen damage while maintaining the display's optimal image quality, an optional protective shield (Fig. 3) is available. This lightweight accessory, which is quickly and easily attached and removed, lengthens the life of the screen by fending off scratches caused by surface contact. The 100% transparent shield features anti-reflective coating on both sides, anti-fingerprint coating on the outside layer, a hard coat for ruggedness and excellent permanent marker resistance.

Sentry^{DX} remote network sensor. For non-assisted conformance, calibration and reporting functions, an optional, retractable remote sensor (Fig. 4) is available for NEC MultiSync MD Series displays. This component, which also can be used with non-MD Series monitors, is capable of measuring monitor brightness, whitepoint and ambient lighting, while performing a quality check for DICOM conformance and contrast response.

* Each end-user environment is unique, therefore NEC Display Solutions recommends that the user follows the quality control and calibration guidelines set forth by the AAPM TG-18.

When combined with an NEC Professional Series display (left), NEC MultiSync MD Series monitors can help provide an ideal PACS configuration for your facility.

		
Model	**MultiSync MD21GS-2MP** **MD21GS-2MP-BK-CB (black) Clear Base Version** **MD21GS-2MP-BK-BB (black) Blue Base Version**	**MultiSync MD21GS-3MP** **MD21GS-3MP-BK-CB (black) Clear Base Version** **MD21GS-3MP-BK-BB (black) Blue Base Version**
LCD Viewable Image Size	21.3"	21.3"
LCD Module Technology	SA-Superfine Grayscale TFT Glass	SA-Superfine Grayscale TFT Glass
Active Screen Area	43.2 x 32.4 cm	43.3 x 32.5 cm
Native Resolution	1200 x 1600 Landscape/1600 x 1200 Portrait	2048 x 1536 Landscape/1536 x 2048 Portrait
Pixel Pitch	0.27mm	0.21mm
Brightness at Native (typical)	900 cd/m² (263 fl) max, 400 cd/m² (117 fl) calibrated	700 cd/m² (204 fl) max, 400 cd/m² (117 fl) calibrated
Contrast Ratio (typical)	700:1	700:1
Response Time (typical)	35ms	35ms
Viewing Angle (typical) (up/down/left/right)	88°/88°/88°/88°	88°/88°/88°/88°
Grayscale Tone	10-bit: 1024 shades of gray from a pallet of 3061	10-bit: 1024 shades of gray from a pallet of 3061
Input Connectors	DVI-D and VGA	DVI-D
Selectable Gamma	DICOM, log-linear, 2.2, 1.8 and programmable	DICOM, log-linear, 2.2, 1.8 and programmable
White Point (color temperature)	CB - P104 simulation, x=.292, y=.321, Approx. 8000 K BB - P45 simulation, x=.265, y=.320, Approx. 14000 K	CB - P104 simulation, x=.292, y=.321, Approx. 8000 K BB - P45 simulation, x=.265, y=.320, Approx. 14000 K
Sensor Calibration Brightness/White Point/External	Yes/Yes/Yes	Yes/Yes/Yes
Power Supply (internal)	Yes	Yes
Power Consumption (typical) (120V)	65W	65W
Power Savings	<3W	<3W
Tilt, Swivel Stand	25° up/5° down, 340°	25° up/5° down, 340°
Height Adjustable Stand	46mm	46mm
Pivot Enabled Stand	Yes	Yes
VESA Mounting	100 x 100mm	100 x 100mm
USB Input	For external colorimeter (calibration mode)	For external colorimeter (calibration mode)
Dimensions (WxHxD)	18.4 x 18.1 x 7.9 in. (Landscape) 14.1 x 20.2 x 7.9 in. (Portrait)	18.4 x 18.1 x 7.9 in. (Landscape) 14.1 x 20.2 x 7.9 in. (Portrait)
Bezel Width	16mm	16mm
Net Weight	25.8 lbs.	25.8 lbs.
Regulatory Standards	UL2601/EN60601-1/EC601, FCC part 15 class B, CE/MDD, PCT, C-tick, PCBC/B Mark, PSB, EnergyStar, GEEA Energy Label, DIN 6868-57, FDA-510K	UL2601/EN60601-1/EC601, FCC part 15 class B, CE/MDD, PCT, C-tick, PCBC/B Mark, PSB, EnergyStar, GEEA Energy Label, DIN 6868-57, FDA-510K
Protection Glass (optional)	MD21PS-BK	MD21PS-BK
Display Video Cards (preferred)	MDM10B-2MP	MDM10B-2MP
Also Recommended	Real Vision, Tech Source	Real Vision, Tech Source
Remote Network Sensor (optional)	Sentry^{DX} (MD-N2M5B)	Sentry^{DX} (MD-N2M5B)
Limited Warranty	1 year, parts and labor	1 year, parts and labor
Extended Warranty (addtl. 1 yr./addtl. 2 yr.)	EW1-MD2MP21/EW2-MD2MP21	EW1-MD3MP21/EW2-MD3MP21

NOTE 1: American College of Radiology (ACR) recommends minimum of 70-ft. lamberts (fl)
NOTE 2: NEC MDview 19" and 21" color LCD monitors with UL60601-1 are available via special order.

Display video card	**MDM10B-2MP**	**MDM10B-3MP**
Shipping Weight	0.66 lbs. /0.3 kg	0.66 lbs. /0.3 kg
Shipping Dimensions (W x H x D)	13.5 x 9.4 x 3 in. /344 x 239 x 76mm	13.5 x 9.4 x 3 in./344 x 239 x 76mm
Graphics Chip	Matrox 512-bit GPU	Matrox 512-bit GPU
Memory Type	DDR (Double Data Rate) SDRAM	DDR (Double Data Rate) SDRAM
Memory Size	256 MB	256 MB
Main RAMDAC	400 MHz	400 MHz
Secondary RAMDAC	400 MHz	400 MHz
Card Type	AGP 2x and 4x compatible or PCI 64-bit, 66 MHz	PCI 64-bit, 66 MHz
Form Factor	ATX	ATX
Maximum Resolution	1920 x 1200 (digital/analog)	2048 x 1536 (digital)
Connectors	2 x DVI-I	2 x DVI-I
Certifcations	Class A: FCC, CE, CSA, VCCI	Class A: FCC, CE, CSA, VCCI
Limited Warranty	1 year	1 Year

MultiSync Makes It Better 20 YEARS

ENERGY STAR

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