

Product Transition Guide

TN: NHD-2.4-240320CF-CTXI | IPS (NEW): NHD-2.4-240320AF-CTXP

The new 2.4" IPS TFT display has been designed with the same mechanical footprint as the current TN display. This makes the IPS display compatible with existing overlays, enclosures and other assembly components that are presently used with the TN display.

The IPS display also uses the same driver IC as the TN display, and the unused (no connect) pins from the TN display have been repurposed on the IPS display to provide customers with multiple interface options.

The purpose of this document is to highlight and explain the key differences that need to be accounted for when transitioning from our 2.4" TN TFT display to our new 2.4" IPS TFT display.

Design Improvements

- Better EMC with built-in EMI shielding
- Better color reproduction throughout the color gamut
- Better optical characteristics (higher contrast, wider viewing angles)
- Better color and image consistency when viewed from various angles
- User selectable Parallel and Serial interface modes
- Top bezel frame for added protection and durability
- Capacitive touchscreen option with built-in cover glass

Display Models

	NHD-2.4-240320CF-CTXI#-F	NHD-2.4-240320AF-CTXP
<i>Display Type</i>	Standard TN	IPS
<i>Display Mode</i>	Normally White	Normally Black*
<i>Resolution</i>	240 x 320	240 x 320
<i>Outer Dimensions</i>	42.8 x 59.91 x 2.55 mm	42.8 x 59.91 x 2.55 mm
<i>Active Area</i>	36.72 x 48.96 mm	36.72 x 48.96 mm
<i>EMI Shielding</i>	No	Yes
<i>FPC Size & Shape</i>	See datasheet	Identical
<i>Pinout</i>	See datasheet	See below
<i>Driver IC</i>	ST7789VI	ST7789VI
<i>Software Timing</i>	See datasheet	Identical
<i>Interface</i>	8/16-bit Parallel	Parallel + SPI
<i>LCD Voltage</i>	3.3V	3.3V
<i>Backlight</i>	80mA @ 3.1V	80mA @ 3.1V
<i>Brightness</i>	350 cd/m ²	350 cd/m ²
<i>Contrast</i>	200	1500



Optimal View	6:00	Full View
Touchscreen Options	No-touch Resistive	No-touch Capacitive Resistive

*A normally black display shows a black screen when backlight is ON, but LCD is OFF. Both components must be powered ON to view the screen.

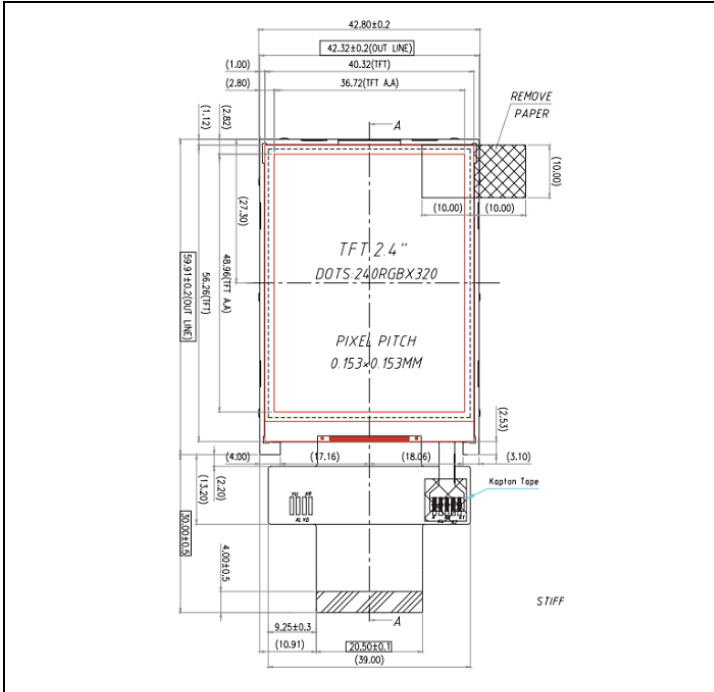
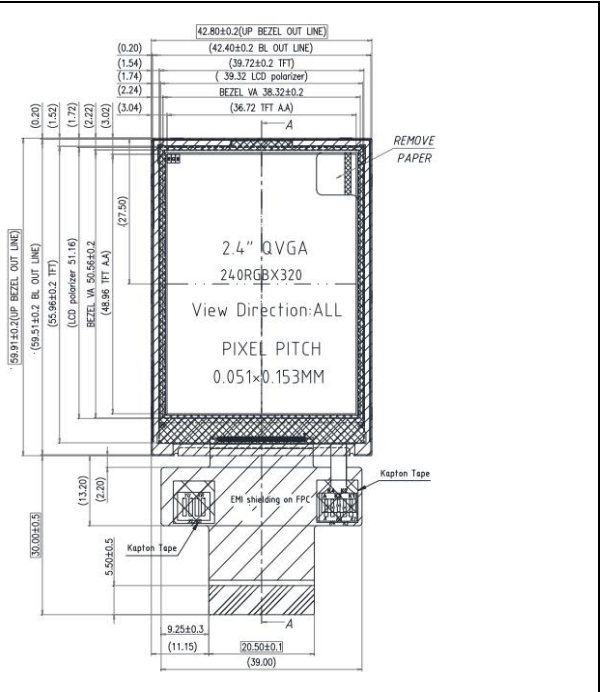
Pinout Comparison

	NHD-2.4-240320CF-CTXI#-F	NHD-2.4-240320AF-CTXP
Pin #	Signal	Signal
1	GND	GND
2	NC	NC
3	NC	NC
4	NC	NC
5	NC	NC
6	NC	SDO
7	VDD	VDD
8	IOVDD	VDDI*
9	NC	SDA
10	/CS	CSX*
11	D/C	DCX*
12	/WR	WRX*
13	/RD	RDX*
14	DB0	DB0
15	DB1	DB1
16	DB2	DB2
17	DB3	DB3
18	DB4	DB4
19	DB5	DB5
20	DB6	DB6
21	DB7	DB7
22	DB8	DB8
23	DB9	DB9
24	DB10	DB10
25	DB11	DB11
26	DB12	DB12
27	DB13	DB13
28	DB14	DB14
29	DB15	DB15
30	/RES	RESX*
31	IM0	IM0
32	NC	IM2
33	GND	GND
34	LED-K	LED-K
35	LED-K	LED-K
36	LED-K	LED-K
37	LED-K	LED-K
38	LED-A	LED-A
39	GND	GND
40	NC	TE

*Symbols have been updated for the new IPS model; however, the same electrical function can be expected.



Mechanical Comparison

NHD-2.4-240320CF-CTXI#-F

NHD-2.4-240320AF-CTXP


Hardware

Wiring

○ Parallel interface

- Pin 32 is No Connect on the TN display, whereas it is IM2 signal on the IPS display. This pin must be pulled low (logic '0') for 8/16-bit interface on the IPS display. Leaving IM2 pin floating (no connect) on the IPS display may result in unexpected behavior.
- Pin 40 is No Connect on the TN display, whereas it is TE signal on the IPS display. This pin can be treated as a no connect if not used.

○ Serial interface

- The IPS display adds the option to select 3-wire SPI interface, rather than parallel interface. Pins 31 (IM0) and 32 (IM2) must be pulled high (logic '1') for 3-wire SPI interface.
- Pin 6 is No Connect on the TN display, whereas it is SDO (Serial Data Output) on the IPS display. This pin can be treated as a no connect if serial interface is not used.
- Pin 9 is No Connect on the TN display, whereas it is SDA (Serial Data Input) on the IPS display. This pin can be treated as a no connect if serial interface is not used.
- Pin 11 functions as the serial clock signal when 3-wire SPI interface is used. This pin functions as the Data/Command Selection pin (DCX) if serial interface is not used.

Software

➤ Initialization

- The new IPS display can be driven using the same 8/16-bit Parallel input timing as the TN display.
- The IPS display mode is Normally Black, whereas the TN display mode is Normally White. The IPS display requires Display Inversion On (command 0x21) to achieve the same appearance as the TN display.
- The photos below illustrate an image on the IPS display before (left) and after (right) adding the Display Inversion On command to the initialization.

NHD-2.4-240320AF-CTXP
With Old Initialization



NHD-2.4-240320AF-CTXP
With New Initialization



For additional support on transitioning to our new 2.4" IPS TFT display, or questions about other products, please contact us through any of our technical support channels listed below:

Email: nhtech@newhavendisplay.com

Online Support Center: [Contact an Engineer](#)

Forum: [Community Forum](#)

Phone: (847) 844-8795