

# Product Transition Guide

TN (OLD): NHD-3.5-320240MF-Axxx | IPS (NEW): NHD-3.5-320240JF-ASXP

The new 3.5" IPS TFT display has been designed with the same mechanical footprint and pinout as the older TN display. This makes the IPS display compatible with controller boards, assemblies, enclosures, and other components that are presently used with the TN display. However, the IPS display is not a drop-in replacement due to the differences in software timing requirements of the old and new driver ICs used within these displays.

The purpose of this document is to highlight and explain the key differences that need to be accounted for when transitioning from our 3.5" TN TFT display to our new 3.5" IPS TFT display.

## Design Improvements

- Better EMC with built-in EMI shielding
- Better color reproduction throughout the color gamut
- Better color and image consistency when viewed from various angles
- Better optical characteristics (higher contrast, higher brightness, wider viewing angles)
- Better FPC design (less susceptible to nicks/tears, larger bendable area, smaller component area)

## Display models

	NHD-3.5-320240MF-ATXL#-1	NHD-3.5-320240MF-ASXV#	NHD-3.5-320240MF-ASXN#	NHD-3.5-320240JF-ASXP
<b>Display type</b>	TN + Standard	TN + Premium	TN + Sunlight Readable	IPS + Sunlight Readable
<b>Resolution</b>	320 x 240	320 x 240	320 x 240	320 x 240
<b>Outer dimensions</b>	76.9 x 63.9 x 3.2 mm	76.9 x 63.9 x 3.2 mm	76.9 x 63.9 x 3.2 mm	76.9 x 63.9 x 3.2 mm
<b>Viewing area</b>	72.28 x 55.36 mm	72.88 x 55.36 mm	72.88 x 55.36 mm	72.88 x 55.66 mm
<b>Active area</b>	70.08 x 52.56 mm	70.08 x 52.56 mm	70.08 x 52.56 mm	70.08 x 52.56 mm
<b>EMI Shielding</b>	No	No	No	Yes
<b>FPC size &amp; shape</b>	See datasheet	See datasheet	See datasheet	Identical
<b>Pinout</b>	See datasheet	See datasheet	See datasheet	Identical
<b>Driver IC</b>	NV3035GTC	NV3035GTC	NV3035GTC	ST7272A
<b>Software timing</b>	See datasheet	See datasheet	See datasheet	Not identical (similar)
<b>Interface</b>	24-bit Parallel RGB	24-bit Parallel RGB	24-bit Parallel RGB	24-bit Parallel RGB
<b>LCD Voltage</b>	3.3V	3.3V	3.3V	3.3V
<b>Backlight</b>	18mA @ 19.2V	40mA @ 19.2V	40mA @ 19.2V	40mA @ 18.6V
<b>Brightness</b>	400 cd/m <sup>2</sup>	800 cd/m <sup>2</sup>	1000 cd/m <sup>2</sup>	1100 cd/m <sup>2</sup>
<b>Contrast</b>	350	350	350	800
<b>Optimal view</b>	12:00	MVA	12:00	Full View
<b>Touchscreen Options</b>	No-touch Capacitive Resistive	No-touch Capacitive Resistive	No-touch Capacitive Resistive	No-touch Capacitive Resistive

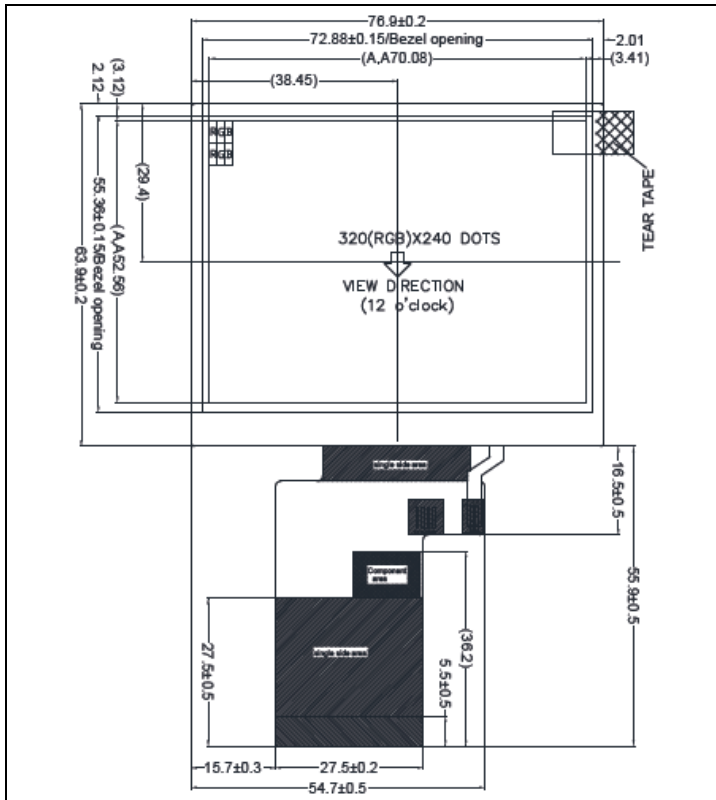


## Pinout Comparison

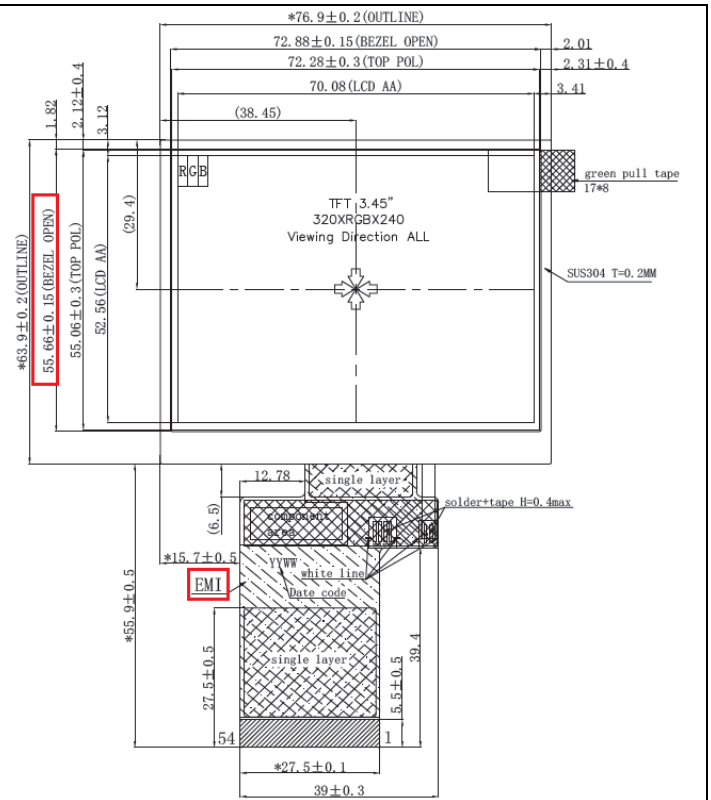
	NHD-3.5-320240MF-Axxx	NHD-3.5-320240JF-ASXP
<b>Pin #</b>	<b>Signal</b>	<b>Signal</b>
1-2	LED_K	LED_K
3-4	LED-A	LED-A
5-7	N.C.	N.C.
8	RSTB	RSTB
9	/CS	/CS
10	SCK	SCK
11	SDI	SDI
12-19	B0-B7	B0-B7
20-27	G0-G7	G0-G7
28-35	R0-R7	R0-R7
36	HSYNC	HSYNC
37	VSYNC	VSYNC
38	DOTCLK	DOTCLK
39-40	N.C.	N.C.
41-42	VDD	VDD
43-51	N.C.	N.C.
52	DEN	DEN
53-54	GND	GND

## Mechanical Comparison

NHD-3.5-320240MF-Axxx



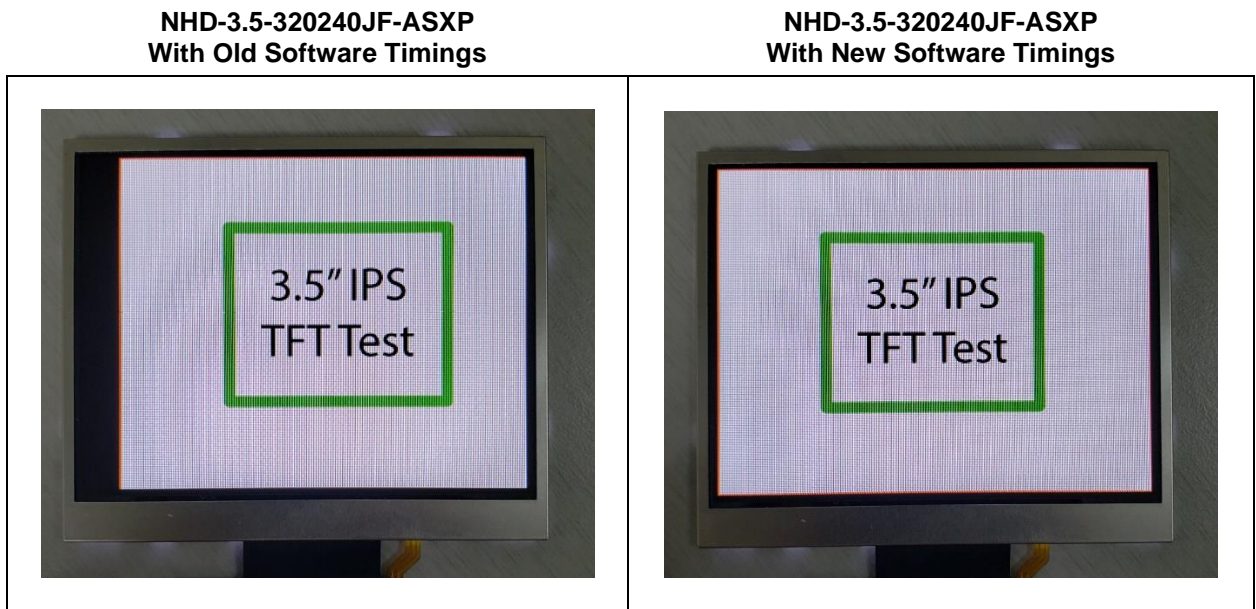
NHD-3.5-320240JF-ASXP



## Software

### ➤ Initialization

- The 24-bit RGB interface timings differ between the 3.5" TN TFT display with [NV3035GTC](#) driver IC and the new 3.5" IPS TFT display with [ST7272A](#) driver IC.
- When interfacing with the new display using old software timings, the displayed image will be shifted down by 1 pixel, and to the right by 26 pixels.
- The photos below illustrate the image position on the new IPS display when driven using the old software timings on the left, and the new software timings on the right.



- Software timings for the new 3.5" IPS display using SSD1963 microcontroller. Differences between the old and new software timings are highlighted in yellow.

```

void setIPS_HSYNC(){
  command(0xB4); // Set Horizontal period
  data(0x01); // Set HSYNC Total = 371
  data(0x73);
  data(0x00); // Set HSYNC back porch
  data(0x2C); // 44 pixel HSYNC back porch
  data(0x0F); // Set HSYNC pulse width = 15
  data(0x00); // Set HSYNC pulse start position
  data(0x00);
  data(0x00); // Set HSYNC pulse subpixel start position
}
void setIPS_VSYNC(){
  command(0xB6); // Set Vertical period
  data(0x01); // Set VSYNC total = 260
  data(0x04);
  data(0x00); // Set VSYNC back porch
  data(0x0C); // 12 pixel VSYNC back porch
  data(0x07); // Set VSYNC pulse width = 7
  data(0x00); // Set VSYNC pulse start position
  data(0x00);
}
  
```

For additional support on transitioning to our new 3.5" IPS TFT display, or questions about other products, please contact us through any of our technical support channels listed below:

Email: [nhtech@newhavendisplay.com](mailto:nhtech@newhavendisplay.com)

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

Forum: [Community Forum](#)

Phone: (847) 844-8795

