

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

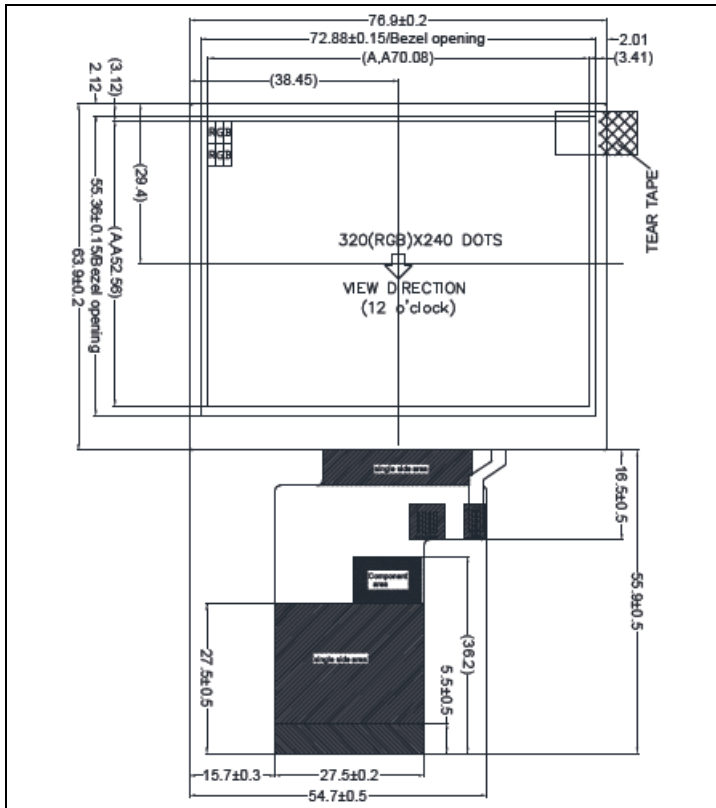


Pinout Comparison

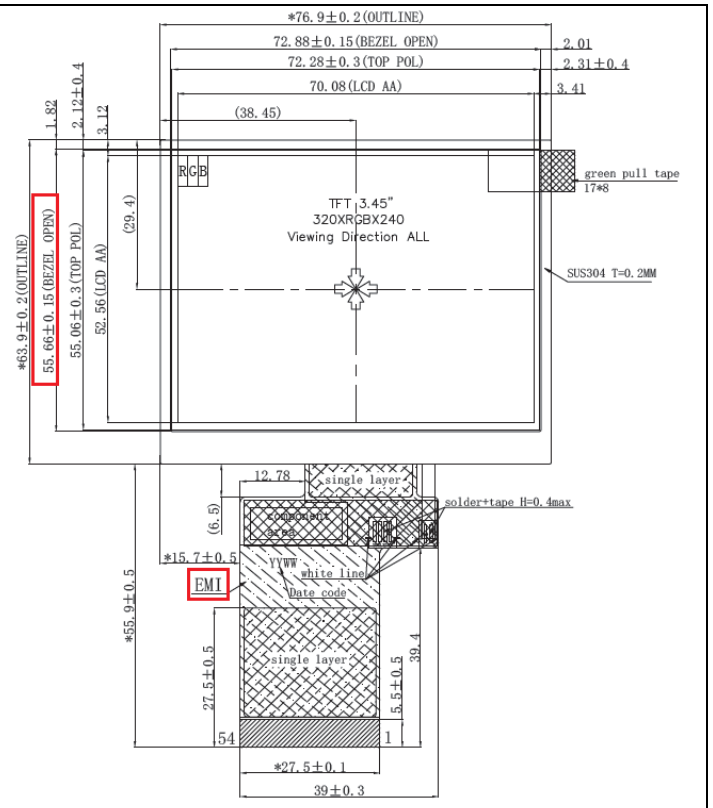
| | NHD-3.5-320240MF-Axxx | NHD-3.5-320240JF-ASXP |
|--------------|-----------------------|-----------------------|
| Pin # | Signal | Signal |
| 1-2 | LED_K | LED_K |
| 3-4 | LED-A | LED-A |
| 5-7 | N.C. | N.C. |
| 8 | RSTB | RSTB |
| 9 | /CS | /CS |
| 10 | SCK | SCK |
| 11 | SDI | SDI |
| 12-19 | 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



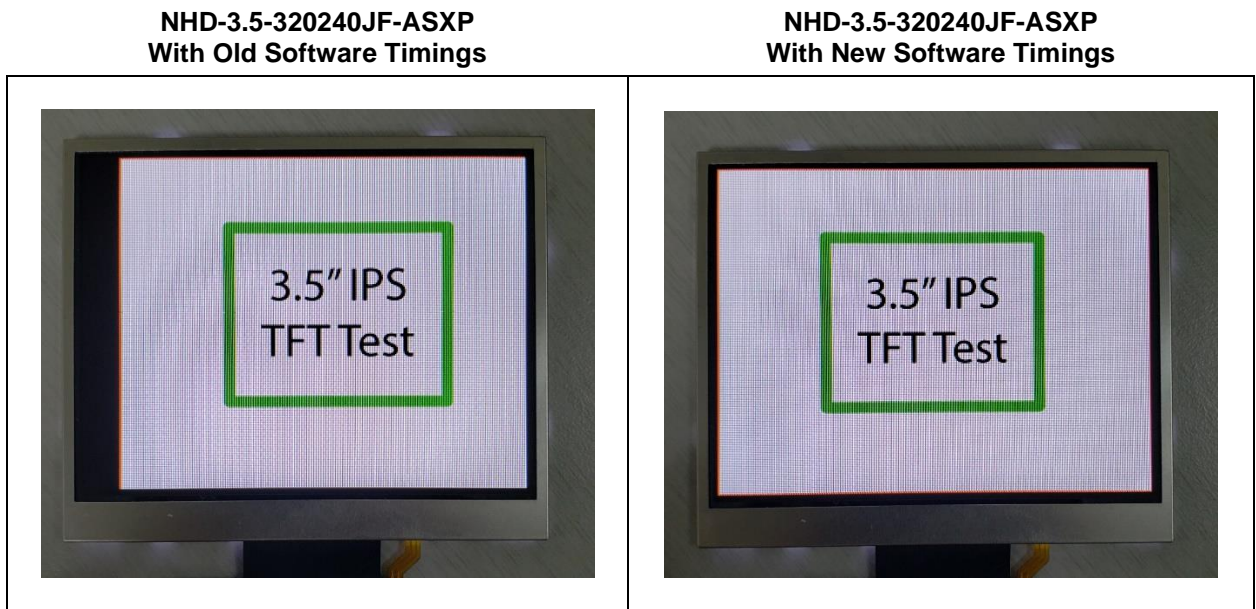
NHD-3.5-320240JF-ASXP



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

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

Forum: [Community Forum](#)

Phone: (847) 844-8795

