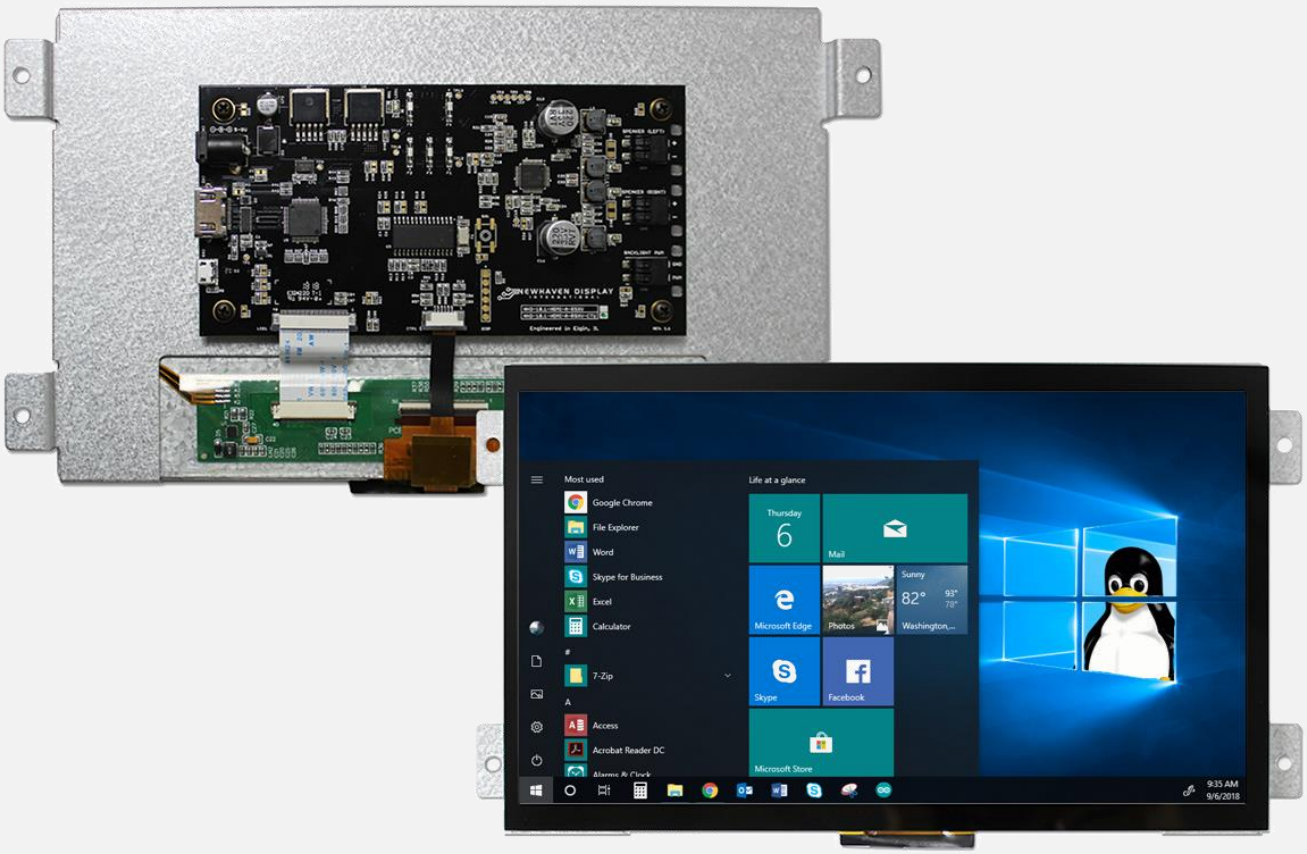
User Guide

NEWHAVEN DISPLAY INTERNATIONAL

10.1" HDMI TFT Modules



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Part Numbering

NHD - x.x - HDMI - x - xxxx - xxx

1 2 3 4 5 6

1	**Manufacturer**	NHD – Newhaven Display
2	**Size** (in inches)	10.1 – 10.1" Diagonal
3	**Interface**	HDMI – HDMI Interface
4	**Descriptor**	A – 1024x600 Resolution, HDMI Audio supported
5	**Type**	RSXV – Premium MVA
6	**Touch Panel**	*n/a* – No Touch CTU – Capacitive USB-HID [Pre-calibrated, No external drivers needed]

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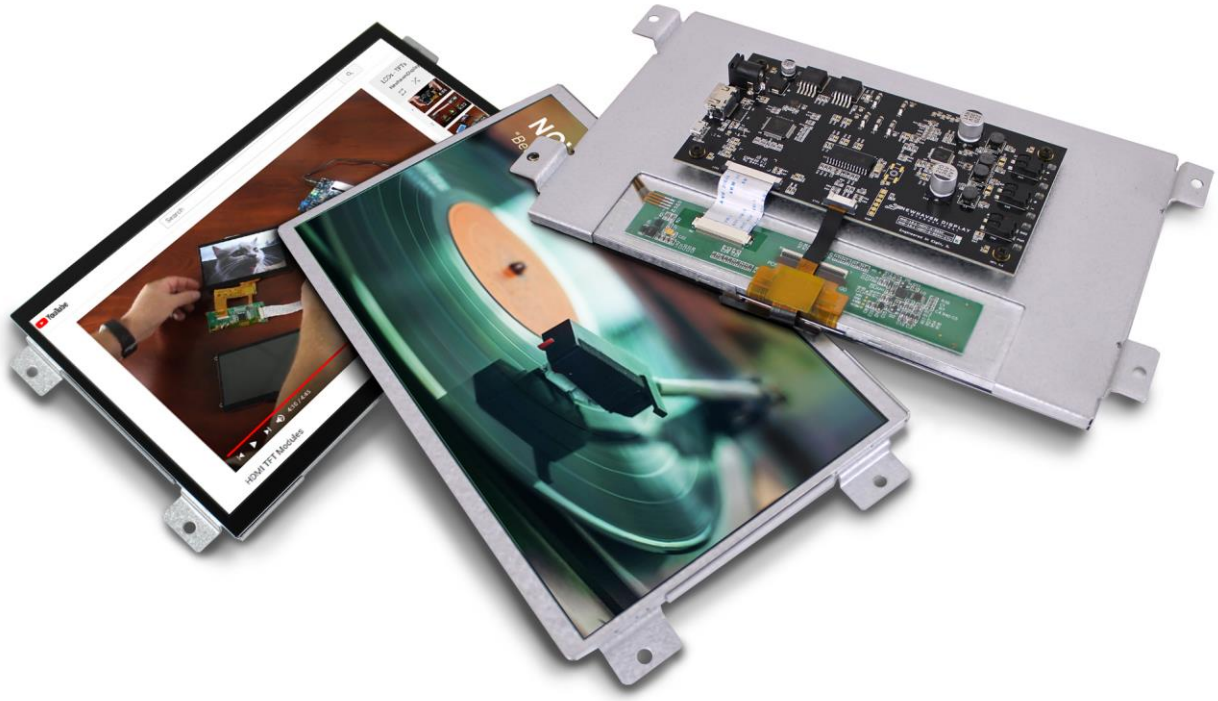
Overview



The HDMI interface has become the most popular video interface standard to date, and HDMI video sources are easier to come by now than ever before. Whether you need an HDMI TFT display for your Raspberry Pi/BeagleBone Black application, a Windows/Windows Embedded PC monitor, or a touch screen HMI for your Linux or other embedded system, the Newhaven Display HDMI TFT product line offers a solution.

Available in 5.0", 7.0", and 10.1" size options, our HDMI TFT Modules unite our existing high-quality TFT display panels with a custom PCB engineered in the USA by Newhaven Display. Assembled to the display, our PCB provides the user an all-in-one, plug-and-play HDMI + USB Touch solution for virtually any application.

- Our 10.1" models support 2-Channel Stereo Audio through HDMI.

Functions and Features

- 10.1" HDMI TFT Module w/ USB-HID Capacitive Touch option
- On-board Analog Devices ADV7611 HDMI Receiver
- Plug-and-play USB-HID Touch, no external driver installation required
- 2-Channel Stereo Audio supported through HDMI; speaker terminal outputs
- HDMI (Type-A) Input
- Compatible with PC (Windows/Linux)
- Compatible with Linux based SBCs such as Raspberry Pi, BeagleBone, etc.
- 24-bit True Color, 1024x600 Resolution (WSVGA)
- High Brightness LED backlight with PWM
- 75° Viewing Angles all sides
- 4 x Mounting Holes (#10-32), compatible with Rack Unit (RU) spacing
- Engineered in Elgin, IL (USA)

Model Information

HDMI Module P/N	TFT Panel Used	Display Type	Luminance Rating	Optimal Viewing Angle	Touch Panel
NHD-10.1-HDMI-A-RSXV	NHD-10.1-1024600AF-ASXV#	Premium MVA	800 cd/m²	75° all angles	No Touch
NHD-10.1 -HDMI-A-RSXV-CTU	NHD-10.1-1024600AF-ASXV#-CTP	Premium MVA	700 cd/m²	75° all angles	Projected Capacitive (USB-HID)

For detailed information on the TFT Panel used, please view its Product Specification by accessing the product webpage link above.

Electrical Characteristics

Item	Symbol	Condition	Min.	Typical	Max.	Unit
Operating Temperature Range	T_{OP}	Absolute Max	0	-	+50	°C
Storage Temperature Range	T_{ST}	Absolute Max	-20	-	+60	°C
Backlight PWM Frequency	f_{PWM}	-	1	-	20	kHz
Backlight PWM Voltage	V_{PWM}	-	2.5	3.3	5.5	kHz
Module Supply Voltage	V_{DD}	-	5.0	7.5	9.0	V
Module Supply Current	I_{DD}	V_{DD} = 5V	-	1.8	2.0	A
		V_{DD} = 9V	-	1.0	1.2	A

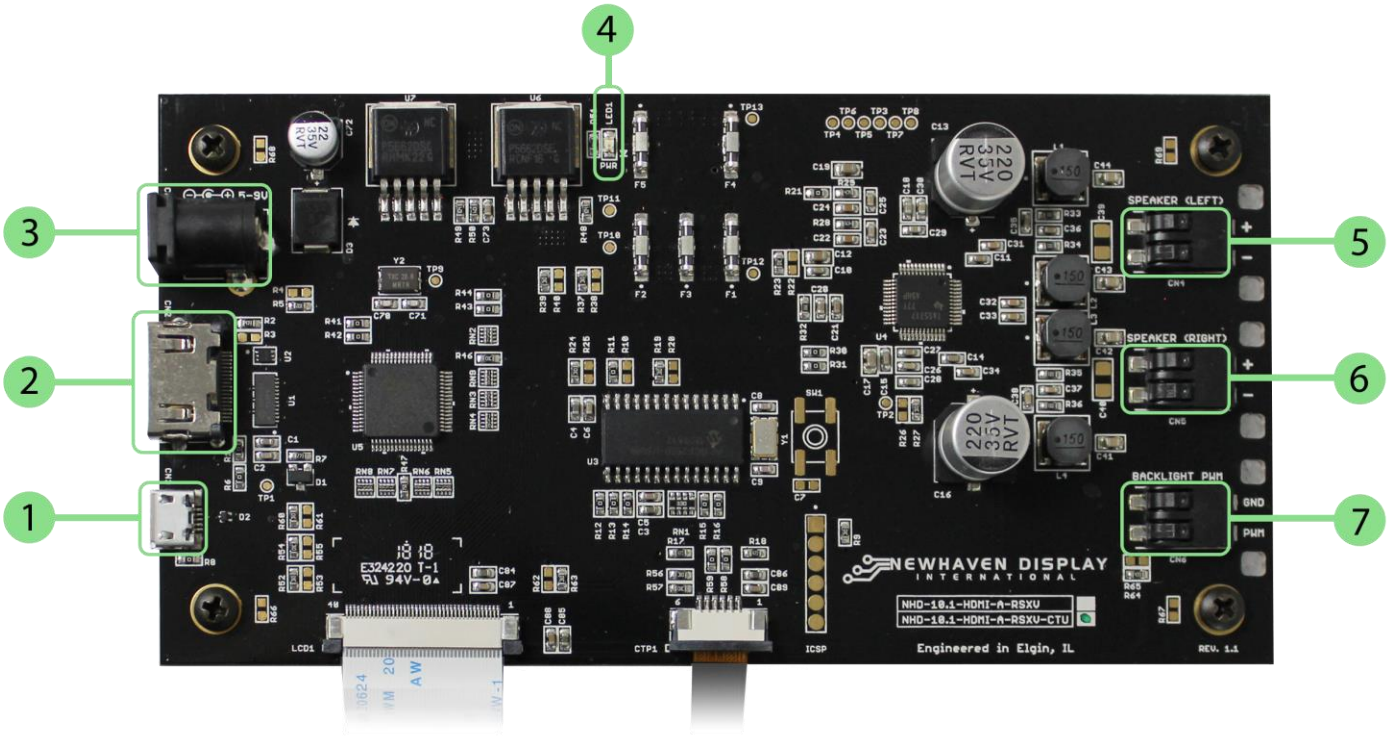
HDMI Receiver Information

On-board Analog Devices ADV7611 Low Power HDMI Receiver.
To view the full ADV7611 specification, please download it by accessing the link below:
http://www.analog.com/media/en/technical-documentation/data-sheets/ADV7611.pdf

Audio Amplifier Information

On-board Texas Instruments TAS5717 Digital Audio Power Amplifier.
To view the full TAS5717 specification, please download it by accessing the link below:
http://www.ti.com/lit/ds/symlink/tas5719.pdf

Interface Description

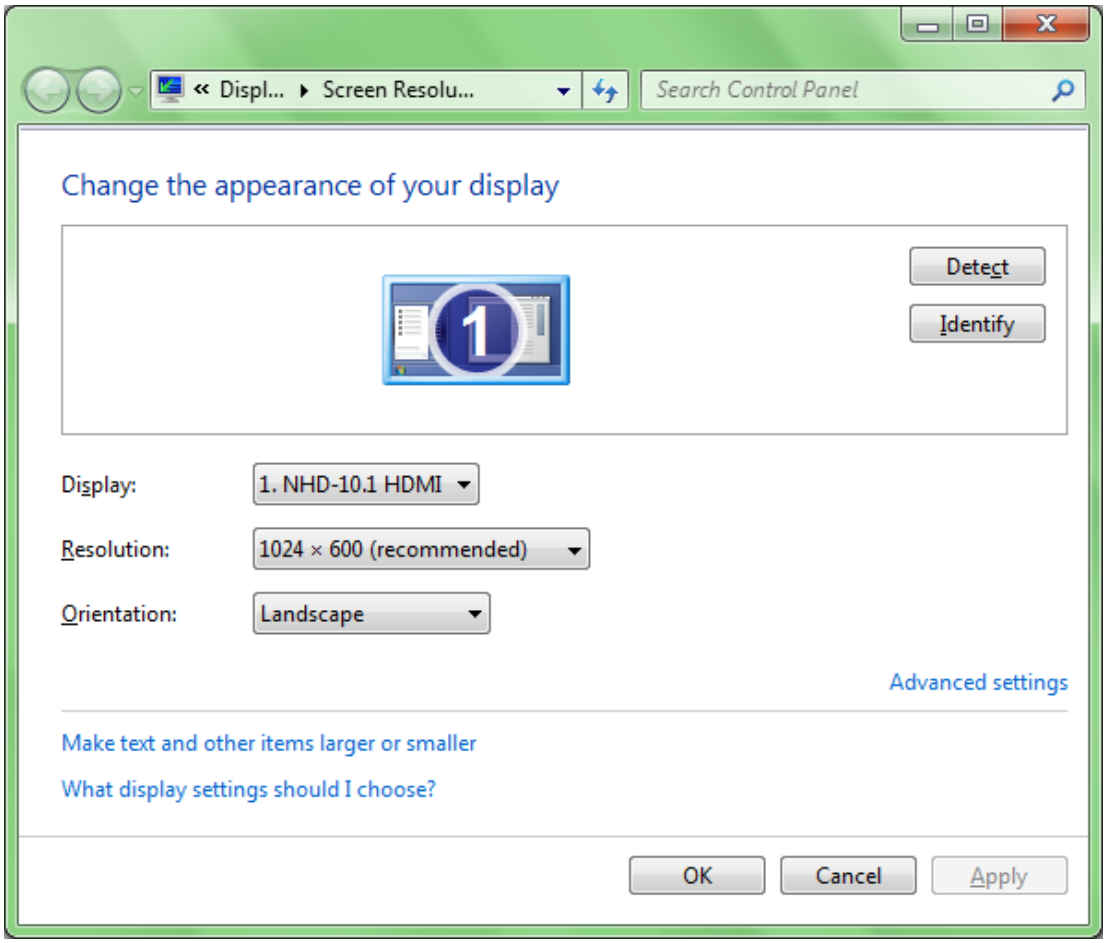


(Capacitive Touch model shown above as reference)

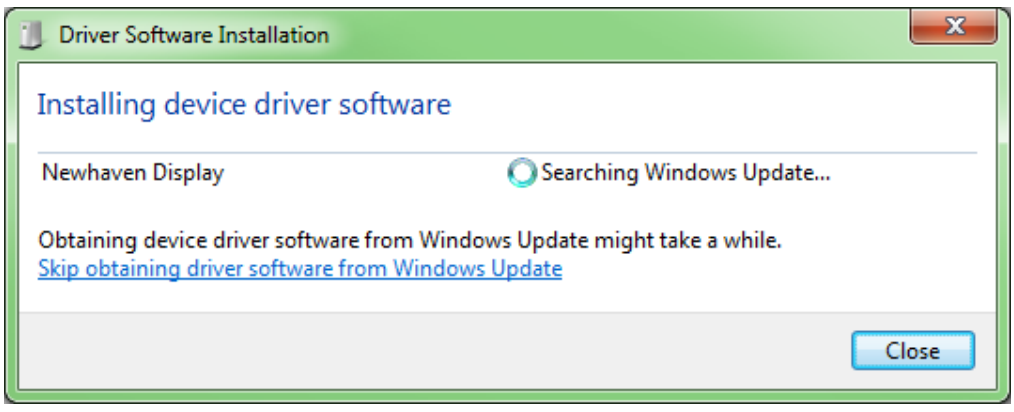
Num.	Description
1)	(CN3) Micro-USB (Type-B) Connector for Touch – *Touch Panel model only* This is to connect the Touch Panel of this module to a USB input to act as a USB-HID device.
2)	(CN2) HDMI (Type-A) Connector This is a full-size HDMI connector meant to connect the HDMI source signal (Video & Audio) to this module. The on-board HDMI Receiver does not scale video resolutions. Therefore, the output resolution of the source must be 1024x600 (WSVGA). In most applications, this is automatically detected by the HDMI source.
3)	(CN1) DC Jack (Center-Positive), 2.00mm ID, 5.50mm OD This is used to supply power to the display module. A DC power supply in the range of 5V – 9V must be used. The output current rating of the DC power supply should be at least the maximum Supply Current (I_{DD}) listed in the Electrical Characteristics section on the previous page.
4)	(LED1) LED Indicator for Power This is a Green LED that will illuminate when DC power is supplied to the module.
5)	(CN4) Terminal Block w/ Push Buttons (24-18AWG wire size), for Speaker output This connection is the speaker output for the (Left) channel. An 8Ω speaker up to 10W can be used here.
6)	(CN5) Terminal Block w/ Push Buttons (24-18AWG wire size), for Speaker output This connection is the speaker output for the (Right) channel. An 8Ω speaker up to 10W can be used here.
7)	(CN6) Terminal Block w/ Push Buttons (24-18AWG wire size), for Backlight PWM This connection allows the user to dim the LED backlight through use of a PWM signal. See Electrical Characteristics for details.

Connecting with Windows/Windows Embedded

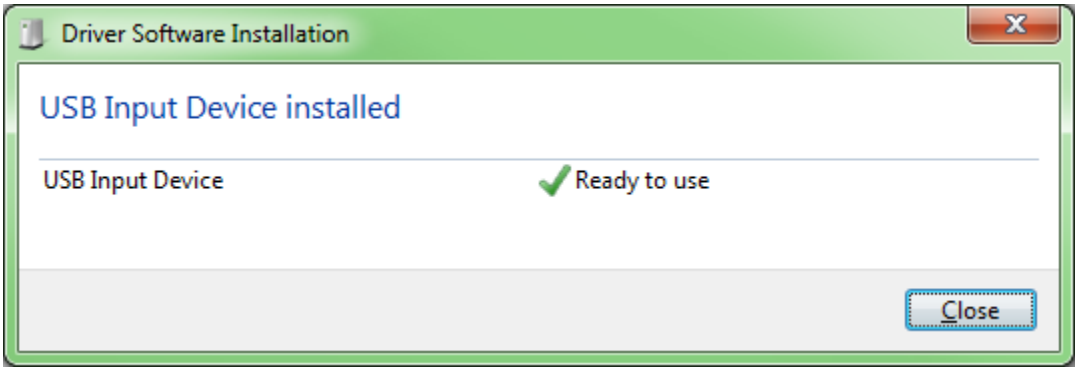
Connecting our HDMI TFT Modules to a Windows system is fully plug-and-play. Start by plugging in a DC power supply in the range of 5 - 9V, with at least 2A of output current. The green LED near at the top of the PCB will illuminate when the board has power supplied to it. Next, connect the display to your system via HDMI cable. Due to the on-board EDID, the display will be detected automatically and the system's output resolution will set itself to 1024x600.



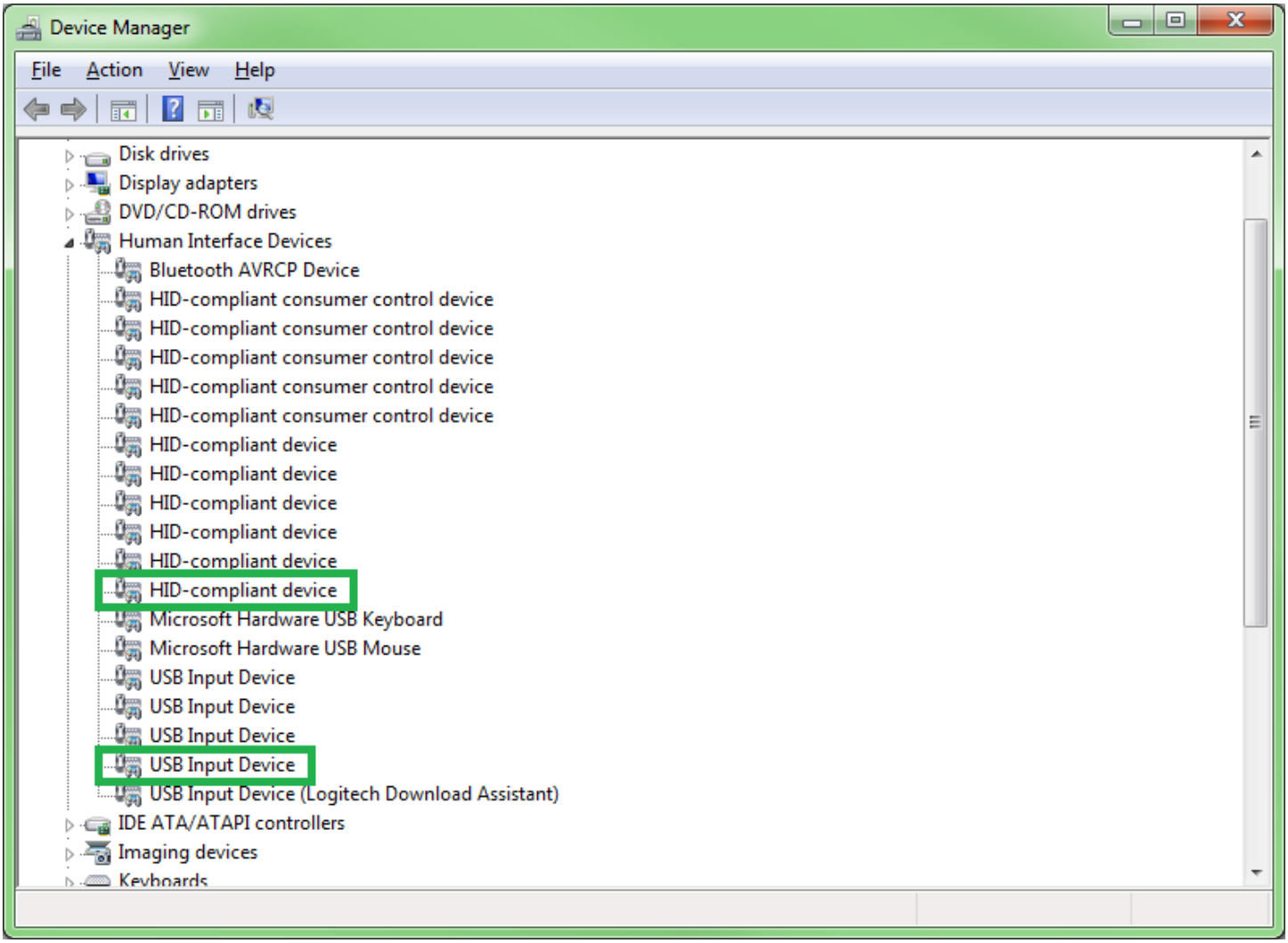
For the Capacitive Touch model, once the display is connected to the system via USB, Windows will automatically detect and install the necessary drivers.



Once Windows has finished installing the drivers, the device will show as 'Ready to use'.



For reference, in Device Manager the USB-HID Touch device will show as below:



Connecting with Linux

Most Linux applications with an HDMI source will also be fully plug-and-play, however when using our HDMI TFT Modules with the Raspberry Pi, the config.txt file on the Pi's microSD card will need to be slightly modified by the user.

The following highlighted lines need to be added in config.txt for proper display output:

```
# For more options and information see
# http://rpf.io/configtxt
# Some settings may impact device functionality. See link above for details

# uncomment if you get no picture on HDMI for a default "safe" mode
#hdmi_safe=1

# uncomment this if your display has a black border of unused pixels visible
# and your display can output without overscan
#disable_overscan=1

# uncomment the following to adjust overscan. Use positive numbers if console
# goes off screen, and negative if there is too much border
#overscan_left=16
#overscan_right=16
#overscan_top=16
#overscan_bottom=16

# uncomment to force a console size. By default it will be display's size minus
# overscan.
#framebuffer_width=1280
#framebuffer_height=720

# uncomment if hdmi display is not detected and composite is being output
#hdmi_force_hotplug=1

# uncomment to force a specific HDMI mode (this will force VGA)
#hdmi_group=1
#hdmi_mode=1

hdmi_group=2
hdmi_mode=87

hdmi_cvt=1024 600 60 6 0 0 0

# uncomment to force a HDMI mode rather than DVI. This can make audio work in
# DMT (computer monitor) modes
#hdmi_drive=2

# uncomment to increase signal to HDMI, if you have interference, blanking, or
# no display
#config_hdmi_boost=4

# uncomment for composite PAL
#sdtv_mode=2

#uncomment to overclock the arm. 700 MHz is the default.
#arm_freq=800

# Uncomment some or all of these to enable the optional hardware interfaces
#dtparam=i2c_arm=on
#dtparam=i2s=on
#dtparam=spi=on

# Uncomment this to enable the lirc-rpi module
#dtoverlay=lirc-rpi

# Additional overlays and parameters are documented /boot/overlays/README

# Enable audio (loads snd_bcm2835)
dtparam=audio=on
```

Audio Support

Most HDMI TFT Modules on the market today do not support audio through HDMI. Our 10.1" HDMI TFT Module stands apart from the norm by utilizing an Analog Devices HDMI Receiver which extracts HDMI audio, and sends the digital signal to the on-board Texas Instruments Audio Amplifier. At the output of the audio amplifier, our module features easy-to-use speaker terminal blocks (24 – 18 AWG wire) which allow our module to be easily connected to (2) standard 8Ω speakers, up to 10W each. Some reference speakers are linked below:

Digi-Key	Mouser
PUI Audio, Inc., 8ohm, 10W Speaker	PUI Audio, Inc., 8ohm, 10W Speaker
CUI Inc., 8ohm, 10W Speaker	CUI Inc., 8ohm, 10W Speaker
CUI Inc., 8ohm, 3W Speaker	CUI Inc., 8ohm, 3W Speaker

Technical Resources

2D Drawings

NHD-10.1-HDMI-A-RSXV

NHD-10.1-HDMI-A-RSXV-CTU

3D Models

NHD-10.1-HDMI-A-RSXV

NHD-10.1-HDMI-A-RSXV-CTU

Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+60°C, 240hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-20°C, 240hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+50°C, 120hrs	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	0°C, 120hrs	1,2
High Temperature / Humidity Operation	Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time.	+50°C, 90% RH, 120hrs	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	0°C, 30min -> 25°C, 5min -> 50°C, 30min = 1 cycle 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	10-55Hz, 15mm amplitude. 60 sec in each of 3 directions X,Y,Z For 15 minutes	3
Static electricity test	Endurance test applying electric static discharge.	Air: Vs=8KV, Contact: Vs=4KV, 10 times	

Note 1: No condensation to be observed.
Note 2: Conducted after 4 hours of storage at 25°C, 0%RH.
Note 3: Test performed on product itself, not inside a container.

Precautions for Using LCDs/LCMs

See Precautions at www.newhavendisplay.com/specs/precautions.pdf

Warranty Information

See Terms & Conditions at http://www.newhavendisplay.com/index.php?main_page=terms

Document Revision History

Revision	Date	Comments
1.0	9/6/2018	Initial Release