

The product is an excellent device with excellent quality but this is not a waveshare.com 5" display (no problem, it was not advertised by HackerStore being waveshare).

This product is electronically identical with waveshare.com 5" TFT with touchscreen with one single important modification:

TP\_IRQ pin = pin 11 of the ADS7846 (DIL 16 pins situated close to the 26 pin connector) is connected to the Raspberry 26 pin connector to pin 15 = GPIO22

In the waveshare design, the ADS7846 pin TP\_IRQ is connected to the pin 22 = GPIO25

If you spy the SPI data stream between SPI and RaspberryPi and you read the Texas Instruments ADS7846 reference Guide, you can see that the ADS7846 is used in Power Down mode (SPI command word with bit PD0=0).

Any pressure on the screen will generate an interrupt, pin TP\_IRQ. Linux driver for the touchscreen use this interrupt to start SPI conversation with the touchscreen.

No interrupt --> no possibility to read the touchscreen --> touchscreen is unresponsive with waveshare.com settings

-----SOLUTION-----

1. Having the last Raspbian OS from official raspberrypi.org - downloads section,

2. `sudo apt-get install -y libts-bin evtest xinput python-dev python-pip`  
`sudo pip install evdev`

3. `sudo nano /boot/config.txt`

ADD at the end of file:

```
#-----TFT 5 inch display from HackerStore -----  
-----  
hdmi_group=2  
hdmi_group=1  
hdmi_group=87  
hdmi_cvt 800 480 60 0 0 0  
#----touchscreen ADS7846 included in the TFT 5" from HackerStore-----  
-----  
dtoverlay=ads7846,cs=1,penirq=22,penirq_pull=2,speed=50000,keep_vref_on=0,swapxy=0,p  
max=255,xohms=150  
#-----END of FILE-----  
-----
```

Explanations for /boot/config.txt

important: penirq=22 --> GPIO22, the TFT 5" from waveshare has penirq=25 (GPIO25)

cs=1 --> SPI use SPI0\_CS1 and we can use for other purposes this SPI with SPI0\_CS0 available

penirq\_pull=2 --> pin used for reading the touchscreen interrupt must have the internal pull-up activated.

keep\_vref\_on=0 --> resistive matrix is used in differential mode and according the ADS7846 reference guide this command bit must be zero.

3. Device tree must be activated and SPI must be activated using

```
sudo raspi-config
```

4. Nothing to be added for the ads7846 in /etc/modules -in waveshare docs exist a mention having in /etc/modules

```
ads7846_device
```

This is deprecated, the overlay from /boot/config.txt above has this role.

5. sudo nano /boot/cmdline.txt

ADD at the end of the current line:

```
fbcon=map:10 fbcon=font:ProFont6x11 logo.nologo
```

6. sudo nano /etc/X11/xorg.conf/99-calibration.conf

```
Section "InputClass"  
    Identifier "calibration"  
    MatchProduct "ADS7846 Touchscreen"  
    Option "Calibration" "208 3905 288 3910"  
    Option "SwapAxes" 0  
End Section
```

Final: reboot Raspberry to load the driver for TFT and the driver for the touchscreen

Test & debug:

```
sudo evtest
```

Will be displayed the available events to be tested

Press 0 for event0 associated with this touchscreen

Now each touch with the stylus will be monitored as event with details to the screen and CTRL-C will end the event test (evtest).

xinput application is the app for tuning and touch calibration, waveshare.com site has detailed explanations valid for this 5" TFT and touchscreen.

Also rotation of the display, rotation of the xy touchscreen axes are well documented to the waveshare.com site.