Configure Waveshare 7-inch HDMI for Linux

Waveshare 7-inch HDMI displays often require specific configuration tweaks to work with newer Linux kernels, such as those in Ubuntu 24.04 (Noble Numbat). Because these screens often act as standard HDMI monitors, they may fail to initialize, display a black screen, or show "no signal" if the resolution/timing isn't recognized, especially on Raspberry Pi systems.

Here are the steps to troubleshoot and fix this, ordered by likelihood of success.

1. Configure `/boot/firmware/config.txt` (Raspberry Pi)

The most common issue is improper resolution settings in the boot config file.

1. Open terminal or SSH into your Pi
2. Edit the configuration file:

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

3. Ensure the following lines exist (or adjust them) to force HDMI and set the resolution to 1024x600 (common for the 7" C/D models):

```
hdmi_group=2
hdmi_mode=87
hdmi_cvt=1024 600 60 6 0 0 0
hdmi_force_hotplug=1
# Disable overscan if needed
disable_overscan=1
```

4. *Note*: You may need to disable the `vc4-kms-v3d` driver if it causes issues, though this is rarely recommended on newer, fully upgraded systems. Try adding `#` before `dtoverlay=vc4-kms-v3d`.

2. Force EDID or Timing (If the above fails)

If the screen still doesn't turn on, you may need to force the driver to use a specific display timing.

- **Fix HDMI Port**: If using a Pi 4/5, plug the HDMI cable into HDMI 0 (the port closest to the USB-C power port), not HDMI 1.
- **Set Display Timing**: You may need to add `drm_kms_helper.edid_firmware=edid/1024x600.bin` to your boot arguments in `/boot/firmware/cmdline.txt`, or follow the Waveshare Wiki to copy specific edid binary files to `/lib/firmware/`.

3. Check Power Supply

Waveshare 7" displays are power-hungry. If they are powered through the Pi's USB ports, they may not turn on. Ensure the display itself is getting enough power (ideally via a separate 5V/2A power supply or a strong PSU for the Pi).

4. Enable Touchscreen Driver (If display works, but touch doesn't)

If the screen shows images but touch is not working, it may be because Ubuntu 24.04 uses Wayland by default, while older Waveshare drivers were for X11.

- Try disabling Wayland to switch to Xorg in `/etc/gdm3/custom.conf` (uncomment `WaylandEnable=false`).
- Alternatively, the display often works as a standard HID device, requiring no special drivers.

Summary Checklist

- **HDMI Cable**: Ensure it is robust and connected to HDMI 0.
- **Resolution**: 1024x600 at 60Hz.
- **Power**: Ensure 5V/2A for screen stability.
- **Firmware**: Run `sudo apt update && sudo apt full-upgrade` to ensure your firmware can handle modern displays.