

# PiBox - Feature #839

## Integrate TFT-3.5inch Display

23 Apr 2021 14:55 - Hammel

<b>Status:</b>	In Progress	<b>Start date:</b>	23 Apr 2021
<b>Priority:</b>	Immediate	<b>Due date:</b>	
<b>Assignee:</b>	Hammel	<b>% Done:</b>	60%
<b>Category:</b>	Systems	<b>Estimated time:</b>	0.00 hour
<b>Target version:</b>	2.0 - Harkonnen		
<b>Severity:</b>	01 - Critical		
<b>Description</b>			
This is for PiFile.			
See			
- <a href="https://smile.amazon.com/gp/product/B07N38B86S/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&amp;psc=1">https://smile.amazon.com/gp/product/B07N38B86S/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&amp;psc=1</a>			
- <a href="https://github.com/goodtft/LCD-show">https://github.com/goodtft/LCD-show</a>			
- This has scripts (LCD35-show) that can be used as a basis for installing and configuring what's required. It could probably be made into a config opkg.			
- <a href="https://github.com/goodtft/LCD-show/blob/master/etc/modprobe.d/fbftf.conf">https://github.com/goodtft/LCD-show/blob/master/etc/modprobe.d/fbftf.conf</a> (it supported via fbftf)			
- <a href="http://www.lcdwiki.com/3.5inch_RPi_Display">http://www.lcdwiki.com/3.5inch_RPi_Display</a>			
This display has only a 480x320 display area. I can scale icons to fit this but should expect that, because I'm not using EGL as a Cairo backend (yet) that things might be a little slow.			

### Associated revisions

**Revision 59c1285f - 12 May 2021 22:30 - Hammel**

RM #839: Add pbeventlist to scan for touchscreen event device in scripts.

### History

**#1 - 24 Apr 2021 20:07 - Hammel**

- Severity changed from 02 - High to 01 - Critical

**#2 - 03 May 2021 19:25 - Hammel**

- Status changed from New to In Progress

- % Done changed from 0 to 20

Looks like the model they sent me was actually an [LCD-35](#), not an MHS-35.

Meta build created: lcdshow (not pushed yet).

Package available for testing.

**#3 - 03 May 2021 22:33 - Hammel**

- Description updated

**#4 - 04 May 2021 17:59 - Hammel**

The build seems to work on the dev platform if I use the following command from a terminal window.

```
FRAMEBUFFER=/dev/fb1 startx
```

This is with the HDMI plugged in and acting as the default display. Touchscreen works but might be rotated incorrectly - the display is in landscape mode but touchscreen appears to be in portrait mode. I'll deal with the touchscreen later.

So now I need to see how I can force the TFT to be used at boot. I might need to use [fbcon](#) on the cmdline or [con2fbmap 1 1](#). But mostly I just need to find out if there are one or two fb devices when HDMI is not plugged in, then set the X.org startup to use the correct device. This could be done, potentially, by using different xorg.conf files and specifying the [TFT device conf](#) like so.

```
Section "Device"
    Identifier   "Allwinner A10/A13/A20 FBDEV"
    Driver       "fbturbo"
    Option       "fbdev" "/dev/fb1"

    Option       "SwapbuffersWait" "true"
EndSection
```

#### #5 - 04 May 2021 18:03 - Hammel

- Description updated

#### #6 - 05 May 2021 09:30 - Hammel

Oh look - [someone else](#) is doing exactly what I'm doing. This could be really helpful.

#### #7 - 05 May 2021 15:03 - Hammel

I have scripts to switch from HDMI to TFT and back, but they're hacks that just rerun startx. Exiting the xterm that gets started from that drops me back to the last startx. So running pibox-tft puts me on the TFT and exiting that puts me back on the HDMI.

That's good enough for testing purposes to get the rest of the display working but not a production method of swapping. I need either fbcp or con2fbmap apparently.

The current problem is the display size. Setting the framebuffer wxh did squeeze the width but not the height.

I need to review the following links and gather information on how to complete this project:

1. <https://github.com/notro/fbtt/wiki>
2. <https://learn.watterott.com/hats/rpi-display/fbtt-install/>
3. <https://learn.watterott.com/hats/rpi-display/faq/>
4. <http://www.willprice.dev/2017/09/16/adventures-with-tft-screens-for-raspberry-pi.html>
5. <https://www.raspberrypi.org/forums/viewtopic.php?t=111817#p1041032>
6. <https://philipp-weissmann.de/touch-display-auf-raspberry-pi-mit-arch-linux/> (German)
7. <https://forum.armbian.com/topic/13221-fbtt-with-device-tree-overlay-on-mainline/> (DTS info)#

#### #8 - 10 May 2021 17:50 - Hammel

Turns out the display is working just fine. All I need to do is add

```
FRAMEBUFFER=/dev/fb1
export FRAMEBUFFER
```

to /etc/init.d/S99UI and the UI starts on the small display. Running pibox-hdmi on there will launch the HDMI display, albeit at the width of the TFT display.

Now I need to test the touchscreen. I should use xinput-calibrate and ts-calibrate for this. I can also do:

```
TSLIB_FBDEVICE=/dev/fb1 TSLIB_TSDEVICE=/dev/input/event0 ts_test  
TSLIB_FBDEVICE=/dev/fb1 TSLIB_TSDEVICE=/dev/input/event0 ts_calibrate
```

An initial attempt at ts\_test locked up the screen. I'll need to write some simplified scripts to make this easier to rerun since there is no shell history to rerun commands in the dev platform.

For xinput-calibrate I should be able copy the output from the following into an xorg.conf file.

```
DISPLAY=:0.0 xinput_calibrator
```

This doesn't work either. I just get "No calibratable devices found". Might need to set an environment variable to find the correct input event file.

#### **#9 - 10 May 2021 21:00 - Hammel**

- *Subject changed from Integrate MHS-3.5inch RPi Display to Integrate TFT-3.5inch Display*

#### **#10 - 12 May 2021 09:14 - Hammel**

The touchscreen is on event4, which I can see by running evtest with no arguments which gives me a list of events with associated names. I need a way to identify the event file in a script - evtest is interactive (at least without arguments).

To get the names of the devices you need an [ioctl](#), which is not easy to call via a shell script. [evtest.c](#) has the scan\_list() function that I could add to piboxlib/ptools/<new tool> to handle this.

#### **#11 - 12 May 2021 11:43 - Hammel**

Added pbeventlist to piboxlib. Needs to be tested on hardware, then used with the TBD scripts that I can use to test the touchscreen.

#### **#12 - 13 May 2021 12:53 - Hammel**

Preparing to test I found I wanted to switch back and forth between the TFT and HDMI. LCDShow-hdmi does this for LCDShow, but it's much simpler than that.

To go from TFT (after lcdshow package is installed) to HDMI

1. Edit config.txt
  1. Comment out framebuffer\_<width,height>
  2. Comment out dtparam=i2c\_arm=on
  3. Comment out dtparam-spi=on
  4. Comment out dtoverlay=ftf35a:rotate=90
2. Edit /etc/init.d/functions
  1. Change FRAMEBUFFER=/dev/fb1 to FRAMEBUFFER=/dev/fb0
3. Reboot

That FRAMEBUFFER change also requires using that variable in /etc/init.d/S99UI.

I need to edit pibox-hdmi to comment these out or uncomment to go back to TFT and then do the reboot.

It's annoying that a reboot is required, but at least I can edit directly on the device for testing purposes. Editing with the TFT is very difficult due to the very small display, which requires very small fonts to get enough visible to be useful.

#### **#13 - 25 May 2021 08:47 - Hammel**

- % Done changed from 20 to 60

Getting closer. S99UI calls xinit directly instead of using startx. The latter honors the FRAMEBUFFER setting. The former is not. I need to find out why.

**#14 - 25 May 2021 09:05 - Hammel**

FRAMEBUFFER would need to be used to manually edit the xorg.conf file, which needs a Device section like so:

```
Section "Device"
    Identifier   "Allwinner A10/A13/A20 FBDEV"
    Driver       "fbturbo"
    Option       "fbdev" "/dev/fb1"

    Option       "SwapbuffersWait" "true"
EndSection
```

So I can either have a copy of this that is edited by the pibox-hdmi script or I can have two copies with ".hdmi" and ".tft" suffices which the script chooses to symlink to the real xorg.conf.