LT768x & TFT Module Check Lists

A. Power Supply

1. Before power on, make sure there is no short circuit.

2. Check if LT768x VDD voltage is 3.3V and stable.

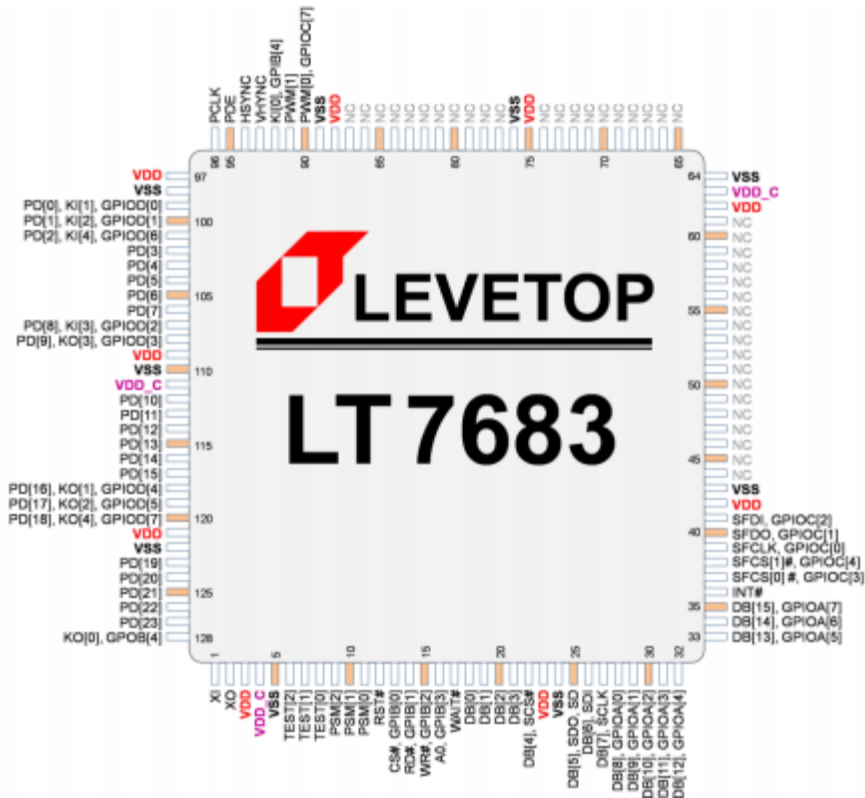3. Check if LT768x VDD_C voltage is 1.8V and stable.

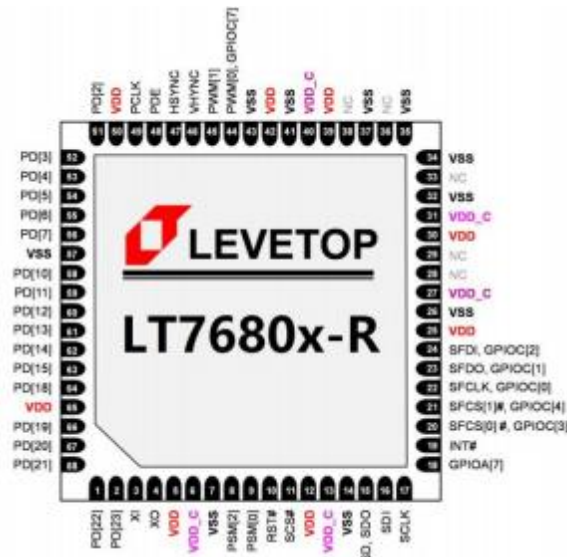Figure 1 : LT7681/LT7683/LT7686 Pin Assignment (LQFP-128Pin)

Figure 2: LT7680x-R Pin Assignment (QFN-68Pin)

B. Clock & External Xtal Circuit

Check if the input clock or the external Xtal circuit (usually 10MHz) is working. If not, examine the clock source, or check if the resistor of the external Xtal circuit is 1M Ohm.
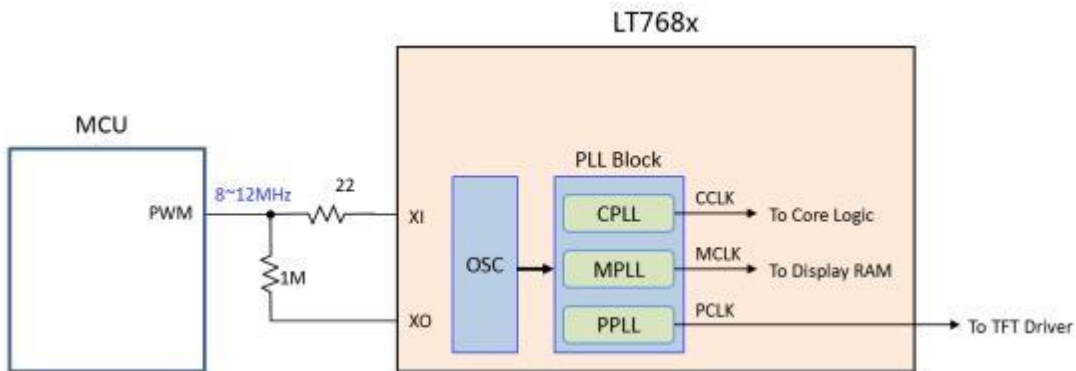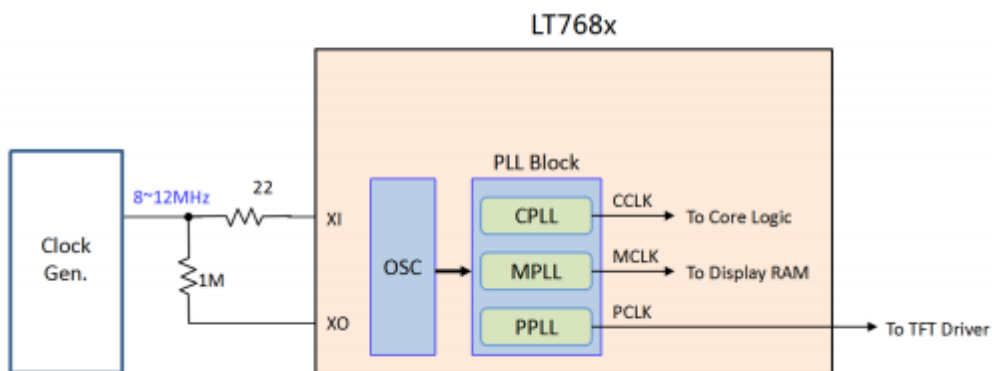

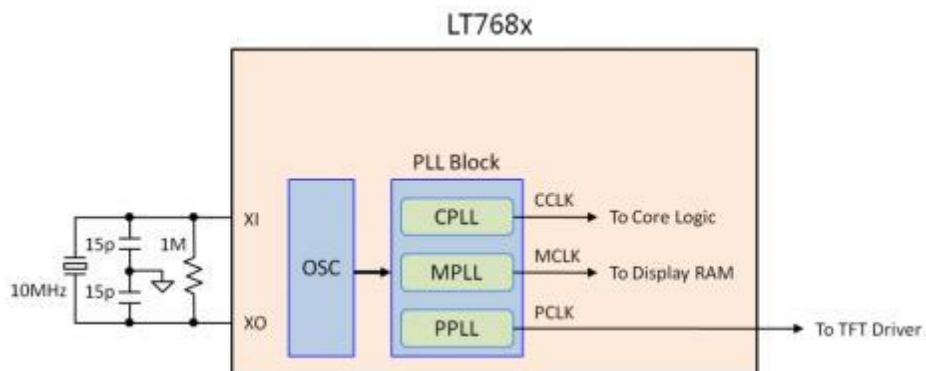Figure 3: LT768x Clock Circuit - 1

Figure 4: LT768x Clock Circuit - 2

Figure 5: LT768x Clock Circuit - 3

C. Reset

Check if the RST# pin can be properly controlled by the MCU. This pin should be at high level after reset.
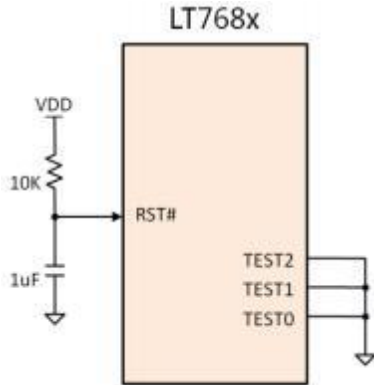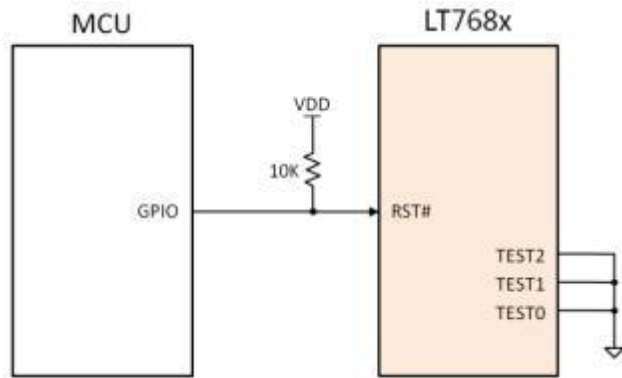

Figure 6: External Reset Method - 1   Figure 7: External Reset Method - 2

D. Test Pin

For LT7681/LT7683/LT7686, check if the TEST[2:0] pins are grounded, as shown in Figure 6 and 7.

E. MCU Interface

1. Check if LT768x PSM[2:0] settings match the MCU interface applied.

Table 1: LT7681/3/6 MCU Interface Mode

PSM[2:0]	MCU Interface Mode
0 0 X	8bits or 16bits 8080 parallel interface mode
0 1 X	8bits or 16bits 6800 parallel interface mode
1 0 0	Serial 3 wire SPI mode
1 0 1	Serial 4 wire SPI mode
1 1 X	Serial I2C mode

2. LT7680A/B only supports serial 3-wire SPI and 4-wire SPI. The PSM[0] pin is already connected to ground inside the IC, while PSM[2] must be connected to high potential. If PSM[1] = 0, then serial 3-wire SPI mode is selected; if PSM[1] = 1, then serial 4-wire SPI mode is selected.

Table 2 ： LT7680 MCU MCU Interface Mode

PSM[2:0]	MCU Interface Mode
1 0	Serial 3 wire SPI Mode
1 1	Serial 4 wire SPI Mode
0 X	Not Allowed

3. The cable length between MCU and LT7680A/B is better to be less than 15CM. If not, it is suggested that developers add a pull-up resistor, or reduce the the transmission speed.

F. Initialization

1. Check if MCU can be programmed. Check if the system initialization is done OK after power on. If not, check MCU peripheral circuits.

2. Check if LT768x is reset successfully by the MCU, that is, if "System_Check_Temp" function can be done after reset. If not, check if the interface and reset pins between MCU and LT768x are properly connected.

3. Check if LT768x is successfully initialized by the MCU. If there is any function that can not be exectued properly, then try to reduce the communication speed between the MCU and LT768x.

4. Check if the MCU can properly communicate with LT768x by the initialization function provided by Levetop.

5. Use "Display_ON" Function provided by Levetop to enable LCD display signals.

G. Display

1. If the above steps are all passed, and the MCU can control LT768x to output signals, for example, red, green and blue color, but there is nothing displayed on the panel, then check if PCLK, DE, HSYNC, and VSYNC have proper waveform outputs. Also check if the signals are delivered to the FPC of the TFT panel. If there is no waveform, then check if the chip has solder joints.

2. If there is no waveform output from PCLK, DE, HSYNC, and VSYNC pins, check if "Display_ON" Function is called.

3. If there is waveform output from PCLK, DE, HSYNC, and VSYNC pins, then check if the PCLK frequency matches the panel and whether the HSYNC and VSYNC timings are correctly set.

4. If LT768x LCD output signals are normal, then check the panel driver circuit voltage. Also, check if the backlight circuit (LEDA+, LEDK-) vlotage meets the panel requirements. If the voltage does not match the spec, then adjust the related circuit.

5. If the panel has a Display ON/OFF control pin, then double check whether the voltage level of the secondary pin meets the requirement. If not, then adjust the circuit.
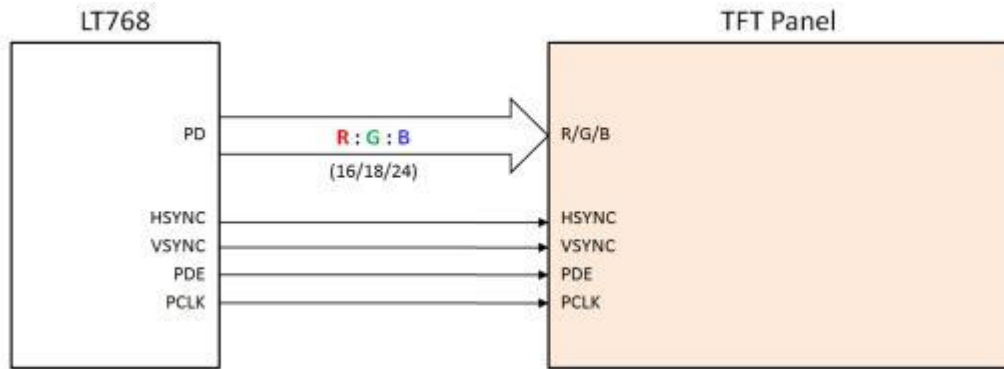
Figure 8: LT768x and TFT Driver Interface

H. SPI Flash

1. If LT768x failed to cmmunicate with SPI Flash, check if the circuit between LT768x and the SPI Flash is properly connected.

2. SPI Flash Programming: (1) For STM32F103+LT7681/3/6 develop board, developers may program the SPI Flash through an SD card. Please refer to LT768x_SD Upgrade.pdf for detail information. Developers may also program the SPI Flash by STM32_BinToFlash program (Please contact Levetop for the documents.); (2) For LT7680A/B develop board, the SPI Flash has to be programmed by a dedicated programmer, please refer to LT_SPI NOR Flash_Programming_V1.0_ENG.pdf for more detail.

3. The Flash bin file can be generated by UartTFT.exe, a software with multiple functions such as transferring pictures, gif, and wav files to bin files, and more.
Please refer to UartTFT_V3.33_ENG.pdf for more detail.

I. Others

Please refer to the datasheet and the application note for detail operation notes. In addition, it is strongly suggested that developers refer to the schematics provided by Levetop before designing their own board. Developers may also download various demo programs from Levetop's website https://www.levetop.cn/en/download2-TFT.html, to better understand how LT768x can be programmed.