INSTRUCTIONS FOR GENERATING AND UPLOADING DTB FILES TO THE BOOT SECTOR

Setup a Petalinux directory. Keep it separated from Vivado.

```
mkdir /misc/scratch/<your eid>/petatlinux/
```

In this directory copy the following directory:
https://projects.ece.utexas.edu/courses/spring_24/ee382n4-17365/arch/labs/BSP/

```
# USE THIS COMMAND TO ACCESS PETALINUX on the LRC Server

source /usr/local/packages/Xilinx_2022.2/petalinux/2022.2/settings.sh

# ========================================================================
# Create new project:
#=========================================================================

petalinux-create --type project --name LAB_2 --source ./BSP/u96v2_sbc_base_2022_2.bsp  --template zynqMP

# ========================================================================
# Change directory to the new Project directory
# ========================================================================

cd LAB_2

# ========================================================================
# Configure the new project by pointing to the HW description produced
# by the Xilinx SDK
# ========================================================================

petalinux-config --get-hw-description=/misc/scratch/<your EID>/LAB_2/system.xsa

# ========================================================================
#  --------   SPECIAL ULTRA96 EDITS that MUST be done for 2022.2   -----
# ========================================================================

gedit components/plnx_workspace/device-tree/device-tree/system-bsp.dtsi
gedit project-spec/meta-avnet/recipes-bsp/device-tree/files/u96v2-sbc/system-bsp.dtsi

Comment out the following lines in both files as shown below:

/* <--------
&axi_intc_0 {
   compatible = "xlnx,xps-intc-1.00.a";
   interrupt-parent = <&gic>;
   interrupts = <0 95 1>;
};
&amba_pl {
   zyxclmm_drm {
      compatible = "xlnx,zocl";
      status = "okay";
      interrupt-parent = <&axi_intc_0>;
      interrupts = <0  4>, <1  4>, <2  4>, <3  4>,
         <4  4>, <5  4>, <6  4>, <7  4>,
         <8  4>, <9  4>, <10 4>, <11 4>,
         <12 4>, <13 4>, <14 4>, <15 4>,
         <16 4>, <17 4>, <18 4>, <19 4>,
         <20 4>, <21 4>, <22 4>, <23 4>,
         <24 4>, <25 4>, <26 4>, <27 4>,
         <28 4>, <29 4>, <30 4>, <31 4>;
   };
};
 --------> */

# ========================================================================
# -------- Build the DTB -----------------
# ========================================================================

petalinux-build -c device-tree
```

The dtb will be in:

```
/misc/scratch/<your EID>/petalinux/LAB_2/images/linux/system.dtb
```

The bit file will be in:

```
/misc/scratch/<your EID>/petalinux/LAB_2/project-spec/hw-description/system.bit
```

Download the system.dtb & system.bit files to the Ultra96 using SFTP. Put the files in the /media directory (you will need to be ROOT to do this)

```
mv system.dtb /media
mv system.bit /media
```

Mount the BOOT sector:

```
cd /media
mkdir BOOT
mount /dev/mmcblk0p1 BOOT
cd BOOT
ls -al
```

You should see the following directory listing:

```
-rwxr-xr-x 1 root root     51102 Dec 16  2022 bl31.bin
-rwxr-xr-x 1 root root    152504 Dec 16  2022 bl31.elf
-rwxr-xr-x 1 root root   7275216 Dec 16  2022 BOOT.BIN
-rwxr-xr-x 1 root root       231 Dec 18  2022 boot.cmd
-rwxr-xr-x 1 root root   7275216 Dec 16  2022 BOOT_EXT4.BIN
-rwxr-xr-x 1 root root   1706512 Dec 16  2022 BOOT_EXT4_NO_BIT.BIN
-rwxr-xr-x 1 root root       755 Dec 16  2022 bootgen.bif
-rwxr-xr-x 1 root root       303 Dec 18  2022 boot.scr
-rwxr-xr-x 1 root root      2777 Dec 16  2022 boot.scr.save
-rwxr-xr-x 1 root root      4435 Dec 16  2022 common.sh
-rwxr-xr-x 1 root root      9864 Dec 16  2022 config
-rwxr-xr-x 1 root root      3028 Dec 16  2022 config.boot_method.EXT4.sh
-rwxr-xr-x 1 root root      1902 Dec 16  2022 config.boot_method.INITRD.sh
-rwxr-xr-x 1 root root      1005 Dec 16  2022 how_to_boot.txt
-rwxr-xr-x 1 root root  21803520 Dec 16  2022 Image
-rwxr-xr-x 1 root root   9425652 Dec 16  2022 image_EXT4.ub
-rwxr-xr-x 1 root root   9357977 Dec 16  2022 Image.gz
-rwxr-xr-x 1 root root   9423200 Oct 30 10:50 image.ub
-rwxr-xr-x 1 root root    498384 Dec 16  2022 pmufw.elf
-rwxr-xr-x 1 root root     37327 Dec 16  2022 pmu_rom_qemu_sha3.elf
-rwxr-xr-x 1 root root      2897 Dec 16  2022 rebuild_u96v2_sbc_base.sh
-rwxr-xr-x 1 root root   5568793 Feb 21  2023 system.bit
-rwxr-xr-x 1 root root     59149 Feb 23  2023 system.dtb
-rwxr-xr-x 1 root root     67737 Feb 23  2023 system.dts
-rwxr-xr-x 1 root root   1293448 Dec 16  2022 u-boot.bin
-rwxr-xr-x 1 root root   1356941 Dec 16  2022 u-boot-dtb.bin
-rwxr-xr-x 1 root root   1423056 Dec 16  2022 u-boot-dtb.elf
-rwxr-xr-x 1 root root   1423056 Dec 16  2022 u-boot.elf
-rwxr-xr-x 1 root root 311717712 Dec 16  2022 vmlinux
-rwxr-xr-x 1 root root    427696 Dec 16  2022 zynqmp_fsbl.elf
```

Save the existing .dtb and .bit files

```
cp system.dtb system.dtb.<some date>
cp system.bit system.bit.<some date>
```

Copy the new .dtb and .bit files into the BOOT partition

```
cp /media/system.dtb .
cp /media/system.bit .
sync
```

If you want to double check that the .dtb file has the correct addresses, convert it to a .dts file that can be read using a vi, vim, emacs or gedit

```
dtc -I dtb -O dts -o system.dts system.dtb
```

Check to make sure both files are in the BOOT directory before rebooting.

```
ls -al system.dt*
```

```
-rwxr-xr-x 1 root root   5568793 Jan 25 09:31 system.bit
-rwxr-xr-x 1 root root     59149 Jan 25 09:31 system.dtb
```

Unmount the BOOT partition

```
umount /dev/mmcblk0p1
```