UART

UART interface available via Serial to USB converter (Micro USB connector J8). Default settings: Baudrate 115200, 1 Start, 1 Stop, No Parity.

I2C

Project have 2 configured I2C interfaces. I2C0 interface routed to connector J10. I2C1 interface provides access to onboard I2C peripherals. Use Linux 'i2cdetect' command to show devices on the bus.

```
root@petalinux:~# i2cdetect -r -y 0
0 1 2 3 4 5 6 7 8 9 a b c d e f
00: -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
root@petalinux:~# i2cdetect -r -y 1
0 1 2 3 4 5 6 7 8 9 a b c d e f
00: -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: 50 -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
```

Where 0x50 is onboard EEPROM chip U2.

QSPI Flash

QSPI flash configured as MTD device in Linux. See http://www.linux-mtd.infradead.org/faq/general.html for help.

Log information shown by 'dmesg' command should contain chip detection and general partition information.

...

[1.731188] m25p80 spi0.0: n25q256a13 (32768 Kbytes)
[1.731222] 3 ofpart partitions found on MTD device spi0.0
[1.731231] Creating 3 MTD partitions on "spi0.0":
[1.731247] 0x000000000000-0x000000100000 : "boot"
[1.731788] 0x000000100000-0x000000140000 : "bootenv"
[1.732334] 0x000000140000-0x000001740000 : "kernel"

...

Several MTD device files should appear in /dev filesystem

root@petalinux:~# ls /dev/mtd*
/dev/mtd0 /dev/mtd1 /dev/mtd2 /dev/mtdblock0 /dev/mtdblock2
/dev/mtd0ro /dev/mtd1ro /dev/mtd2ro /dev/mtdblock1

> ⓘ   Number and size of MTD partitions depend on petalinux configuration.

SD

Linux configures SD interface dynamically as 'mmcblk' device.

The 'mount' command can show you current mount point for SD card partition.

root@petalinux:~# mount
rootfs on / type rootfs (rw,size=372928k,nr_inodes=93232)
proc on /proc type proc (rw,relatime)
sysfs on /sys type sysfs (rw,relatime)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
configfs on /sys/kernel/config type configfs (rw,relatime)
devtmpfs on /dev type devtmpfs (rw,relatime,size=372928k,nr_inodes=93232,mode=755)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
tmpfs on /var/volatile type tmpfs (rw,relatime)
/dev/mmcblk0p1 on /run/media/mmcblk0p 1 type vfat (rw,relatime,gid=6,fmask=0007,dmask=0007,
allow_utime=0020,codepage=437,iocharset=iso8859-1,shortname=mixed,errors=remount-ro)
devpts on /dev/pts type devpts (rw,relatime,gid=5,mode=620,ptmxmode=000)

General Linux filesystem commands can be used to access SD.

root@petalinux:~# ls /run/media/mmcblk0p1
BOOT.bin image.ub

⚠️ Device and Partition numbers depend on SD card partitioning and previous commands.

USB

Board provides USB 2.0 and USB 3.0 host interface. Linux 'lsusb' command should show 2 system hubs and attached devices.

root@petalinux:~# lsusb
Bus 001 Device 001: ID 1d6b:0002
Bus 002 Device 001: ID 1d6b:0003
root@petalinux:~# [719.744554] usb 2-1: new SuperSpeed USB device number 2 using xhci-hcd
[719.771453] usb 2-1: New USB device found, idVendor=8564, idProduct=4000
[719.778083] usb 2-1: New USB device strings: Mfr=3, Product=4, SerialNumber=5
[719.785198] usb 2-1: Product: Transcend
[719.789011] usb 2-1: Manufacturer: TS-RDF5
[719.793178] usb 2-1: SerialNumber: 000000000037
[719.798667] usb-storage 2-1:1.0: USB Mass Storage device detected
[719.805551] scsi host0: usb-storage 2-1:1.0
[720.813782] scsi 0:0:0:0: Direct-Access TS-RDF5 SD Transcend TS38 PQ: 0 ANSI: 6
[720.825666] sd 0:0:0:0: [sda] Attached SCSI removable disk

root@petalinux:~# lsusb
Bus 002 Device 002: ID 8564:4000
Bus 001 Device 001: ID 1d6b:0002
Bus 002 Device 001: ID 1d6b:0003

Ethernet Interface

PS Ethernet controller works in Linux and U-Boot. The default configuration uses DHCP.

root@petalinux:~# ifconfig eth0 192.168.42.77
root@petalinux:~# ping 192.168.42.4
PING 192.168.42.4 (192.168.42.4): 56 data bytes
64 bytes from 192.168.42.4: seq=0 ttl=128 time=0.577 ms
64 bytes from 192.168.42.4: seq=1 ttl=128 time=0.369 ms
64 bytes from 192.168.42.4: seq=2 ttl=128 time=0.357 ms
64 bytes from 192.168.42.4: seq=3 ttl=128 time=0.354 ms
^C
--- 192.168.42.4 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 0.354/0.414/0.577 ms

> ⚠ IP addresses used for test are depend on network configuration.

PCIe Interface

Board provides x1 PCIe interface to onboard M.2 connector. Linux command 'lspci' should show the system root complex and attached devices.

root@petalinux:~# lspci
00:00.0 PCI bridge: Xilinx Corporation Device 7012
01:00.0 Non-Volatile memory controller: Samsung Electronics Co Ltd NVMe SSD Controller SM951
/PM951 (rev 01)

Audio Interface

Simple PWM Interface, not tested, require a Linux driver and multimedia app to be tested.

VGA Interface

Simple video generator core connected to the VGA interface, it generates a test image with a yellow background and blue rectangle.

7-Segment Indicator

Block design with digital clock function connected to 7-Segment indicator interface.

LEDs, Buttons, and DIP Switches

LEDs show the output of counter which can be loaded by the value configured on DIP switches by pressing of any button.