History

Version	Author	Date	Description of the change
1.0	Development	02.09.2019	New creation

Purpose

The purpose of this document is to explain how to configure APCIx-7xxx boards under modern Linux distributions.

Prerequisite

When using more than four serial ports under Linux, the first step is to read the following chapter http://tldp.org/HOWTO/Serial-HOWTO-15.html#ss15.3

To verify the configuration of the running kernel, use the following command where xxxxx must be replaced by the full version of your kernel.

```
root@localhost:~# cat /boot/config-xxxxx | grep SERIAL_8250 | grep _UARTS

CONFIG_SERIAL_8250_NR_UARTS=32
CONFIG_SERIAL_8250_RUNTIME_UARTS=4
```

The consequence of that default kernel configuration is that only devices from /dev/ttyS0 to /dev/ttyS3 are recognized by the system.

The number of UARTS managed at runtime can be dynamically changed without recompiling the Linux kernel by adding for example ***8250.nr_uarts=16*** to the Linux kernel command line.
The value 16 will allow the kernel to manage 16 serial ports up to /dev/ttyS15.

This change is often done using *grub* configuration file. However, the bootloader manager and the configuration file location can vary depending your Linux distribution version.

```
root@localhost:~# cat /etc/default/grub

# If you change this file, run 'update-grub' afterwards to update
# /boot/grub/grub.cfg.
GRUB_CMDLINE_LINUX_DEFAULT="quiet 8250.nr_uarts=16"
```

After reboot, the following check can be done.

```
root@localhost:~# cat /proc/cmdline

BOOT_IMAGE=/boot/vmlinuz-4.9.0-11-amd64 root=/dev/sda1 ro quiet 8250.nr_uarts=16
```

Or

In the following example, we have an additional four ports serial board attached from /dev/ttyS5 to /dev/ttyS8

```
root@localhost:~# dmesg | grep ttyS

[    0.492663] 00:04: ttyS0 at I/O 0x3f8 (irq = 4, base_baud = 115200) is a 16550A
[    0.513090] 00:05: ttyS1 at I/O 0x2f8 (irq = 3, base_baud = 115200) is a 16550A
[    0.534118] 0000:00:03.3: ttyS4 at I/O 0x2248 (irq = 17, base_baud = 115200) is a 16550A
[    0.534319] 0000:30:00.0: ttyS5 at I/O 0x11c0 (irq = 16, base_baud = 115200) is a XR16850
[    0.534426] 0000:30:00.0: ttyS6 at I/O 0x11c8 (irq = 16, base_baud = 115200) is a XR16850
[    0.534529] 0000:30:00.0: ttyS7 at I/O 0x11d0 (irq = 16, base_baud = 115200) is a XR16850
[    0.534636] 0000:30:00.0: ttyS8 at I/O 0x11d8 (irq = 16, base_baud = 115200) is a XR16850
```

Or

```
root@localhost:~# setserial -g /dev/ttyS*

/dev/ttyS0, UART: 16550A, Port: 0x03f8, IRQ: 4
/dev/ttyS1, UART: 16550A, Port: 0x02f8, IRQ: 3
/dev/ttyS10, UART: unknown, Port: 0x0000, IRQ: 0
/dev/ttyS11, UART: unknown, Port: 0x0000, IRQ: 0
/dev/ttyS12, UART: unknown, Port: 0x0000, IRQ: 0
/dev/ttyS13, UART: unknown, Port: 0x0000, IRQ: 0
/dev/ttyS14, UART: unknown, Port: 0x0000, IRQ: 0
/dev/ttyS15, UART: unknown, Port: 0x0000, IRQ: 0
/dev/ttyS2, UART: unknown, Port: 0x03e8, IRQ: 4
/dev/ttyS3, UART: unknown, Port: 0x02e8, IRQ: 3
/dev/ttyS4, UART: 16550A, Port: 0x2248, IRQ: 17
/dev/ttyS5, UART: 16850, Port: 0x11c0, IRQ: 16
/dev/ttyS6, UART: 16850, Port: 0x11c8, IRQ: 16
/dev/ttyS7, UART: 16850, Port: 0x11d0, IRQ: 16
/dev/ttyS8, UART: 16850, Port: 0x11d8, IRQ: 16
/dev/ttyS9, UART: unknown, Port: 0x0000, IRQ: 0
```

Or

```
root@capisimu:~# cat /proc/tty/driver/serial

serinfo:1.0 driver revision:
0: uart:16550A port:000003F8 irq:4 tx:62719 rx:62698 RTS|DTR
1: uart:16550A port:000002F8 irq:3 tx:62546 rx:62620 brk:58 RTS|CTS|DTR
2: uart:unknown port:000003E8 irq:4
3: uart:unknown port:000002E8 irq:3
4: uart:16550A port:00002248 irq:17 tx:19 rx:0 CTS|DSR|CD
5: uart:XR16850 port:000011C0 irq:16 tx:62707 rx:62648 RTS|DTR
6: uart:XR16850 port:000011C8 irq:16 tx:62717 rx:62758 brk:60 RTS|DTR
7: uart:XR16850 port:000011D0 irq:16 tx:62610 rx:62546 RTS|DTR
8: uart:XR16850 port:000011D8 irq:16 tx:62671 rx:62721 brk:58 RTS|DTR
9: uart:unknown port:00000000 irq:0
10: uart:unknown port:00000000 irq:0
11: uart:unknown port:00000000 irq:0
12: uart:unknown port:00000000 irq:0
13: uart:unknown port:00000000 irq:0
14: uart:unknown port:00000000 irq:0
15: uart:unknown port:00000000 irq:0
```