kontron

Using Linux BSP EF801 on KBOX C 101 with Fedora

July 24, 2014

Contents

1 Common notes for using Linux BSP EF801 an KBox C 101 (former CCBoxPC)

1.1 Setting Date and Time

Note, that the KBox C 101 retains the date and time over Power cycles for about 6 weeks. The RTC power is buffered with a goldcap abd nit a battery.

2 Graceful shutdown

2.1 Shutdown in a managed system

In a managed system, the usual and recommended way to shutdown the system is via the CPLD. This is the typical shutdown procedure:

- Operator press the Power button
- The CPLD starts sending power button events to the system
- The ACPI-Daemon receives the event, and initiates a shutdown

Pressing the Power button for more the 4s forces a hardware power off.

It is obvious, that this shutdown must be non-interactive. Some Linux distributions may ask the operator to confirm the shutdown. This has to be disabled. Refer to the user manual of Your chosen Linux distribution for that.

This can be achieved, by entering the following line into the file **/etc/acpi/actions/power.sh**

```
shutdown -h now
```

3 Release Notes

3.1 Release 10

- First production stable release

3.2 Features

- BSP tested with Fedora 20; integrate COMe module: COMe-bHL6
- KONTRON Linux BSP for EF801 release R10
- FW update
- Support for USB, RTC, MM-Sata, I2C, CAN, Serial, Ethernet,

4 Usage instructions

4.1 FW update

not supported in R10

4.1.1 Support for Ethernet

The system contains three Ethernet interfaces *em1*, *p1p1* and *p2p1*.

Note

The em1 interface is connected the single plug.

4.1.2 for CAN device

The EF801 provides an otional CAN interface. The CAN support chip is the SJA1000. It's supported by the kernel driver **sja1000_isa.ko**

not supported in R10

4.1.3 Serial ports

The KBOX C 101 provides one (optional two) serial interfaces.

- /dev/ttyS0 - at the front
- /dev/ttyS1 - at an optional module

Necessary BIOS setting:

```
Advanced | SuperIO Configuration | SIO Serial Port 0 | Enabled
                                                       Base Adress 3F8  IRQ 4
Advanced | SuperIO Configuration | SIO Serial Port 0 | Enabled
                                                       Base Adress 2F8  IRQ 3
```

4.1.4 Support for USB

The KBOX C 101 provides 4 USB interfaces available for the user. The connectors are on the front. They are supported out of the box by Fedora.

4.1.5 Kontron watchdog driver

The EF801 contains the watchodg implemented in CPU board logic. There are two kernel drivers **kontronwdt.ko** and **komdrv.ko** that support this device. The watchdog provides following functions:

- set time
- set mode
- enable watchdog
- trigger watchdog

Note

Once started the watchdog can not be stopped or reconfigured until system is rebooted!

The watchdog may be configured by user space application. Proper API is provided in the BSP.

5 BSP components

The BSP provides following components:

- driver package - the Kontron watchdog driver
- library package - the API for watchdog, EEPROM, configuration access
- application package - the tools and demo-applications presenting provided library API
- configuration package

5.1 Driver package

The driver package provides the *komdrv.ko* and *kontronwdt.ko* drivers for watchdog device support. - These drivers are not loaded automatically during init by system mechanisms. Additionally, the *komdrv.-ko* driver in the subdirectories of *//proc/driver/kontron-ef801-drv* provides following information:

- *bsp* - kontron driver package name and version
- *cfgstat* - configuration of EF001 board
- *info* - board ID code, board version and logic version
- *io* - status of internal switches and IOs
- *led* - interface for quering and setting the LEDs available under the service flap
- *reset* - last reset status
- *wd* - information regarding the watchdog state

5.2 Applications and libraries packages

The library package provides API for the EPPROM and HMI controller access and the Watchdog control.

The i2c-dev driver has to be loaded (modprobe i2c-dev).

Redhat package *i2c-tools* provides useful tools for dealing with the I2C-Bus, for example the *i2cdetect* tools

```
# yum install i2c-tools ......
[root@localhost kontron]# i2cdetect -l
i2c-0   i2c             i915 gmbus ssc                          I2C adapter
i2c-1   i2c             i915 gmbus vga                          I2C adapter
i2c-2   i2c             i915 gmbus panel                        I2C adapter
i2c-3   i2c             i915 gmbus dpc                          I2C adapter
i2c-4   i2c             i915 gmbus dpb                          I2C adapter
i2c-5   i2c             i915 gmbus dpd                          I2C adapter
i2c-6   i2c             DPDDC-B                                 I2C adapter
i2c-7   i2c             DPDDC-C                                 I2C adapter
i2c-8   i2c             DPDDC-D                                 I2C adapter
i2c-9   smbus           SMBus CMI adapter cmi                   SMBus adapter
```

User EEPROM is available on kem i2c bus. and as visible above, in this case on */dev/i2c-10*.

not supported in R10

```
- \b kontron_get_articlenum \n
- \b kontron_get_sernum \n
```

```
Show the board article number, index and serial number of CPU board (by default
      ) and IO board.
Note, to read the informations from IO board use these tools in following way:

# kontron_get_articlenum -i /dev/i2c-9 -a 0x53
material number : 1036âÍŠ9744
index : 12498
# kontron_get_sernum -i /dev/i2c-1 -a 0x53
1951334500439987
```

not supported in R10

- **ledctl** This application controls the LEDs available under the service plate. Ex.:

  ```
  # ledctl -l 0 -c on -a red
  This board provides 4 user controllable LEDs
  #
  ```

  Above command sets the LED number 0 to red color.

- **ee_demo**

  This sample code shows how to use the EEPROM access API. It allows to write and read data, ex.:

  ```
  # ee_demo -i /dev/i2c-0 -w 0 ef001_
  wr 0x00: "ef001_"
  # ee_demo -i /dev/i2c-0 -r 0
  rd 0x00: ef001_
  #
  ```

- **wd_demo**

  This sample code shows how to use the watchdog API. It:

  - starts watchdog
  - configures the trigger period
  - configures the operating mode
  - triggers the watchdog until user interrupt

  Ex.:

  ```
  # wd_demo -i
  Watchdog ident string: kontron-ef001-drv 0100-r4
  Watchdog version     : 1
  Supported Routings   : IRQ  RES  CCD_IRQ TIMEOUT

  Supported Timeout values:
  Index  Timeout [s]
   0      0.125
   1      0.250
   2      0.500
   3      1.000
   4      2.000
   5      4.000
   6      8.000
   7     16.000
   8     32.000
   9     64.000
   10   128.000
   11   256.000
   12   512.000
   13  1024.000
  ```

```
 14  2048.000
 15  4096.000
# wd_demo -d /dev/kontronwdt -t 5 -r IRQ
Setting watchdog route to IRQ
Setting time value to 4.000 seconds
ESTIMATED TIMEOUT VALUE IS : 4.000
Dog is watching. Press ENTER to stop retriggering

    ^ ^
    o -
    -u-

Triggering Stopped
After Watchdog Timeout of 4.000 seconds IRQ will occur
```

6 Peculiarities or Restrictions:

missing features:

- Fw update
- CAN support
- EEPROM access