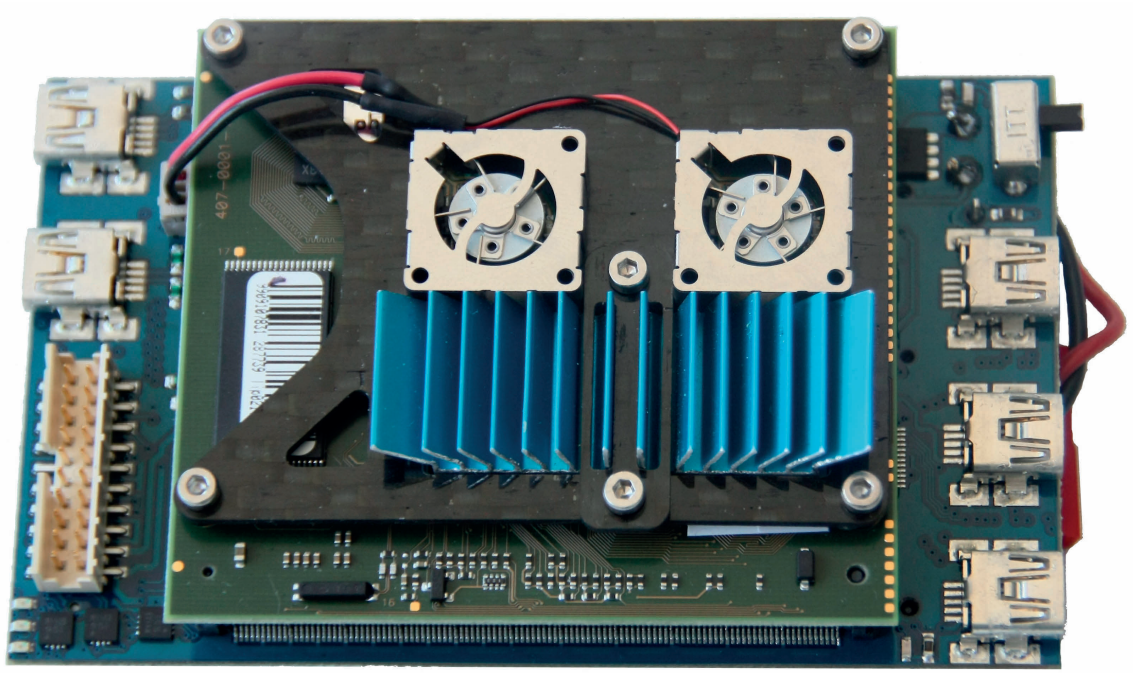
CoreExpress Carrierboard Manual v1.0

Ascending Technologies GmbH



Contents

1 System Overview

1.1 Status LEDs

green Power

orange SD-Card r/w access

red UART transfer

blue Status of connected mini PCIe device

1.2 Interfaces

1.2.1 USB Ports

- Ports 7 and 8 support USB 2.0 devices only. Most keyboards/mouses might not work on these ports. All other ports support USB 1.1 as well as USB 2.0.
- Port 8 is shared with the mini-PCIexpress connector. See 1.2.2.
- Port 3 can be configured in the BIOS either as client or host port. This port is not powered, i.e. the client/host has to be powered externally. The port is set up as client port as default.
- Each port can source 500 mA. Permanent load on all ports should not exceed 1000 mA. Peak load should be at maximum 2000 mA.

1.2.2 Mini PCI express Port

According to the mini PCIexpress specification, this port is equipped with one PCIexpress lane and one USB port. Which port is used depends on the design of the mini PCIexpress module. In case it uses USB, USB port 8 is occupied by this module and must not be connected to any other device.

1.2.3 Micro SD-Card Port

The SD card interface is SDHC compatible allowing you to use Micro SD-cards > 2 GB. The port is internally connected to the System Controller Hub directly and not via USB. Therefore r/w operations have no influence on the USB bus as it would be the case for Atom N2xx series processors. The BIOS is able to boot from SD cards.

1.2.4 UART Ports

The board is equipped with a dual port FTDI (FT2232) serial to USB converter that is connected internally to USB port 1. Under Linux, both UARTs appear as `/dev/ttyUSB0` and `/dev/ttyUSB1`.

Pinout on the 10-pos DF13 mini-connector (as seen from the CoreExpress module):

Pin	Name
1	TXD
2	RXD
3	$\overline{\text{RTS}}$
4	$\overline{\text{CTS}}$
5	$\overline{\text{DTR}}$

Pin	Name
6	$\overline{\text{DSR}}$
7	$\overline{\text{DCD}}$
8	$\overline{\text{RI}}$
9	+5V
10	GND

A flashing LED (red) next to the connector indicates data transfer.

1.2.5 Display Connector

On this connector, you can connect LVDS displays for debug/installation purposes such as our display available as accessory. The LVDS port supports 18 and 24 bit color displays. Power for backlight and backlight enable/brightness signals are available as

well. In case you want to connect your own LVDS display, please contact us for further information.

To connect/disconnect the display, always power off the system! Otherwise, the LVDS port or the display could be damaged permanently.
In order to work with the display, connect the grey ribbon cable of the display to the display connector (white) on the carrierboard and switch on the carrierboard.

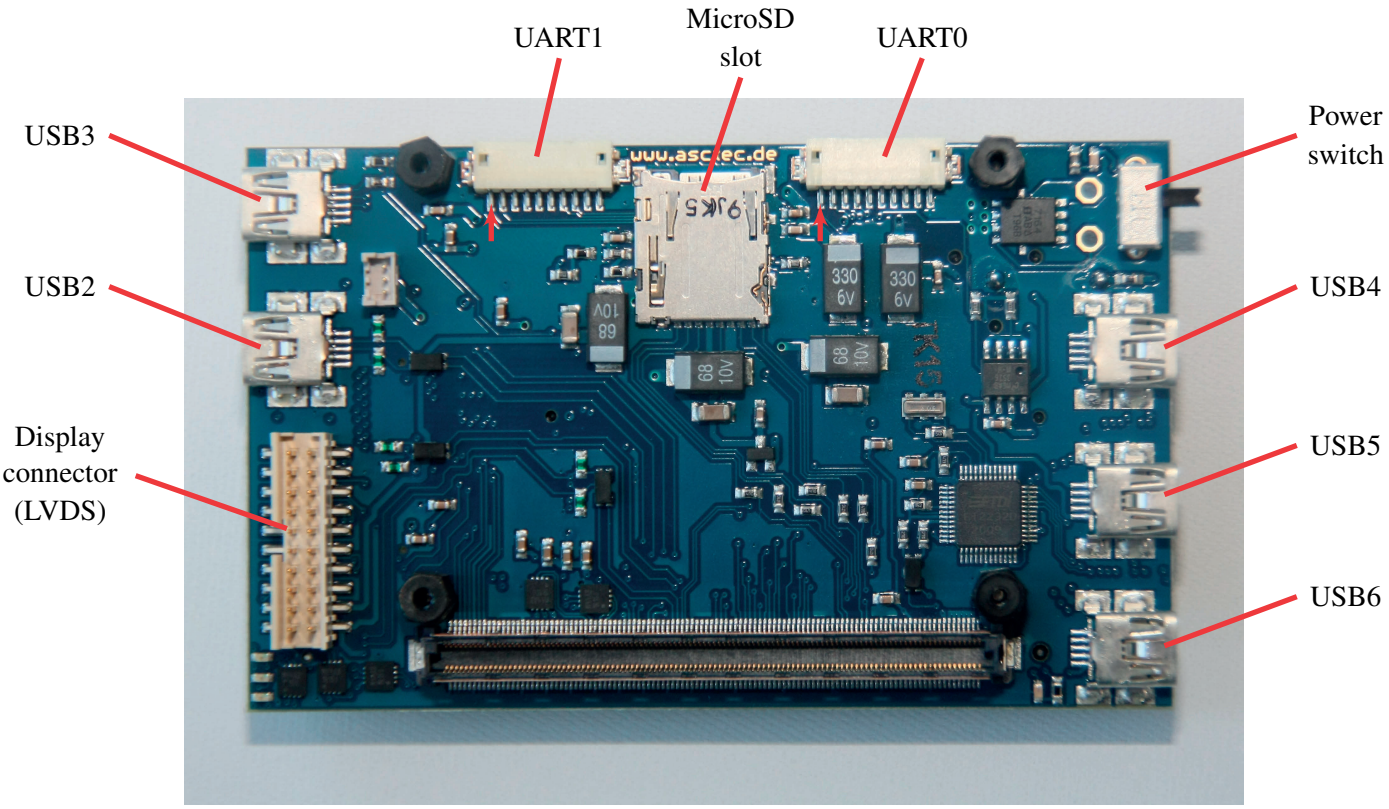


Figure 1.1: Carrierboard top view

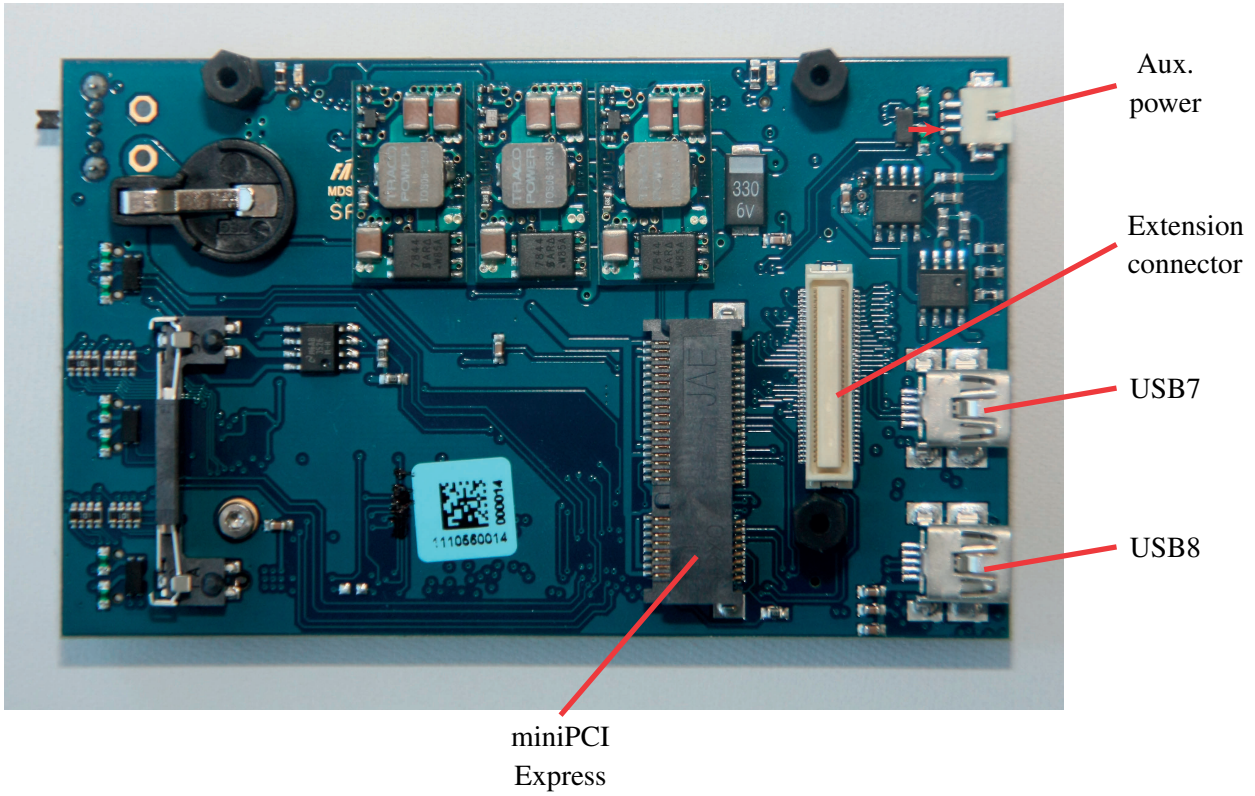


Figure 1.2: Carrierboard bottom view

2 Preinstalled Ubuntu on micro SD card

To make the start easier, we already preinstalled Ubuntu 9.04 on a 8 GB micro SD card.

2.1 Login

The OS boots to a console login by default.

- User: asctec
- Password: asctec

To start the grahical user interface, run `startx`.

Serial console login Alternatively, you can login via a serial console (38400, 8, N, 1) on UART1. `tty6` is configured to output/receive commands on `/dev/ttyUSB1`.

2.2 Drivers

2.2.1 Wifi

The stock dirvers coming with Ubuntu 9.04 still have issues with the support of 801.11n for the latest wireless LAN cards. Therefore, we compiled and installed the drivers from `http://www.linuxwireless.org/`. We recommend the use of WLAN devices with Atheros chipsets because Linux driver support seems to be the best. A list of supported devices is also available at `http://www.linuxwireless.org/`

If you update your kernel, please download the latest version of the Linux wireless driver that is suitable to the new kernel version, install the kernel-headers and compile and install the new driver version.

We removed the GNOME Networkmanager and installed the networkmanager *wicd* instead. wicd runs more stable and runs as a service. You can configure it with a GUI to automatically connect to you desired wireless network. Once configured properly, the connection will be established without having to log into your system locally. Depending on your wireless device, one of the blue status LEDs indicates that a connection is established.

Attention: Wireless networks secured with WEP do not support 802.11n speed! Either use unsecured wireless networks or better WPA(2) secured networks with AES encryption.

2.2.2 USB Client port

You can use the USB client port (port 3) to act either as mass storage device or as a networking device using the *Linux-USB Gadget API Framework*, which is already installed. For a full documentation, see `http://www.linux-usb.org/gadget`.

Additionally, to make the gedget drivers working with the USB-client port, you need to patch and recompile your kernel. The patch and a manual is located in the folder “intel.com” on the Desktop of the user asctec.

2.2.3 Graphics

The Intel GMA500 graphics card is not supported by Ubuntu 9.04 by default. Therefore,

```
deb http://ppa.launchpad.net/
  ubuntu-mobile/ppa/ubuntu jaunty main
deb-src http://ppa.launchpad.net/
  ubuntu-mobile/ppa/ubuntu jaunty main
```

was added to the repositories list and the packages `psb-firmware psb-modules psb-kernel-source psb-kernel-headers xpsb-glx poulsbo-driver-2d` were installed.

Additionally, the section “Device” in `/etc/X11/xorg.conf` was changed to:

```
Section "Device"
  Identifier "Configured Video Device"
  Option "Accel Method" "EXA"
  Option "DRI" "off"
  Option "MigrationHeuristic" "greedy"
EndSection
```

3 Installation of Linux on SD card

3.1 Installation

Create a bootable Live USB drive that contains the installation files. We recommend using *UNetbootin* (`http://unetbootin.sourceforge.net`).

We highly recommend to install Linux on the target SD card inserted into a USB cardreader. This is because standard installation routines might not recognize the SD card properly which might cause errors during installation. Also, to succesfully boot from SD card, some extra steps will be necessary that can be performed the easiest way when the OS was booted from the SD card in the card reader.

Connect the cardreader as well as the bootable USB stick, switch on your CoreExpress computer and press *.ESC* during startup. In the boot-menu, select *Hard Disk* and then your USB stick.

Follow the instructions of the installation routine of your Linux distribution. Select the SD card in the cardreader as target device. You should choose manual partitioning. Create an ext3 partition for the operating system and do not create a swap partition. Proceed with the installation.

3.2 Enable Boot from SD card

After having installed Linux succesfully, leave the SD card in the cardreader and boot your new installation from the cardreader for the first time. In order to enable booting from SD card, some modules have to be built into the initramfs-image: Add the following modules to `/etc/initramfs-tools/modules` (each in one line):

- sdhci
- sdhci-pci
- mmc_block

Save the file and run `update-initramfs -u` with root priveledges.

Make sure that the root-partition in `/boot/grub/menu.lst` is set correctly. The SD card should appear either as `/dev/mmcblk0p1` or with its UUID.

3.3 Further Notes

In case you installed from a USB stick and automounting devices throws errors, comment out a line in `/etc/fstab`, that looks like this:
`/dev/sdb1 /media/cdrom0 udf,iso9660 user,noauto,exec 0 0`

4 Contact Information

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