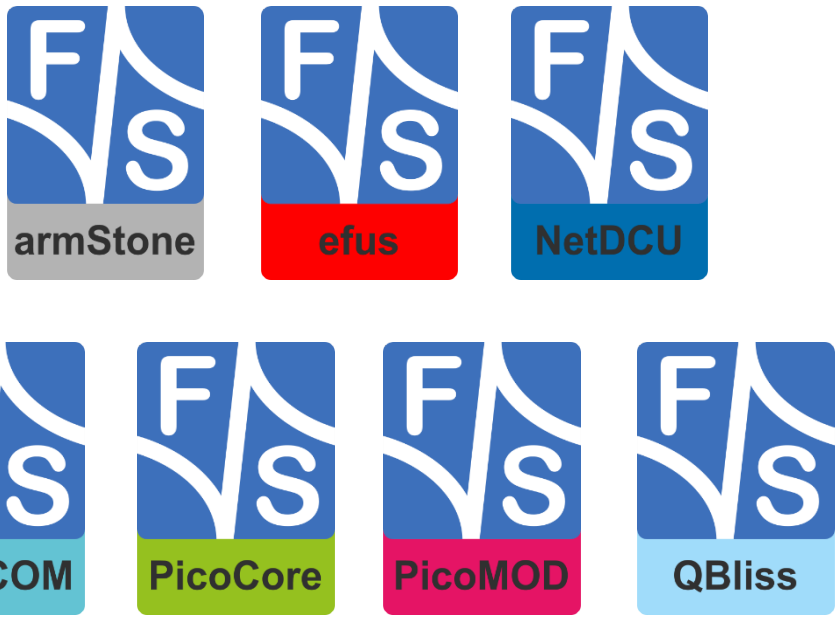
F&S i.MX8 ULP Linux

First Steps

Version 1.2
(2025-09-25)



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About This Document

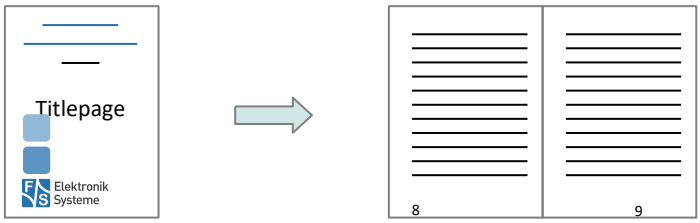
This document shows how to bring up F&S boards and modules under Linux, how to update firmware and how to use the system and the devices. It covers also compiling bootloader, Linux kernel and root filesystem as well as how to build your own applications for the device.

Remark

The version number on the title page of this document is the version of the document. It is not related to the version number of any software release! The latest version of this document can always be found at http://www.fs-net.de.

How To Print This Document

This document is designed to be printed double-sided (front and back) on A4 paper. If you want to read it with a PDF reader program, you should use a two-page layout where the title page is an extra single page. The settings are correct if the page numbers are at the outside of the pages, even pages on the left and odd pages on the right side. If it is reversed, then the title page is handled wrongly



and is part of the first double-page instead of a single page.

Typographical Conventions

We use different fonts and highlighting to emphasize the context of special terms:

`File names`

Menu entries

```
Board input/output
```

`Program code`

```
PC input/output
```

```
Listings
```

```
Generic input/output
```

`Variables`

History

Date	V	Platform	A,M,R	Chapter	Description	Au
2024-01-26	1.0	fsimx8ulp	A	ALL	Based on fsimx7ulp V1.3	CS
2024-04-09	1.1	fsimx8ulp	A,M	2, 3, 5, 6	Add Information for PicoCoreMX8ULP and FS_8ULP_OSM-SF	CS
2024-12-12	1.2	fsimx8ulp	A,M,R	3.2.1,3.2.2, 3.2.3,5.2.4, 6.1, 4.11,	Changes in Image Deployment, modify GPIO-Description	CS
2025-09-25	1.3	Fsimx8ulp	A,M	2.2, 5.2	Added Skit OSM8ULP based on PicoCore Skit	CS

V	Version
A,M,R	Added, Modified, Removed
Au	Author

Table of Contents

1 Introduction

1.1 F&S Board Families and CPU Architectures

F&S offers a whole variety of Systems on Module (SOM) and Single Board Computers (SBC). For new projects there are different board families that are named armStone, efus, OSM, PicoCore, SMARC and SolderCore.

Family	Type	Size
armStone™	Single Board Computer	100 mm x 72 mm (PicoITX)
efus™	System on Module	62 mm x 47 mm
OSM™	BGA System on Module SGeT	30 mm x 30 mm
PicoCore™	System on Module	40 mm x 35 mm
SMARC™	System on Module SGeT	82 mm x 50 mm
SolderCore™	BGA System on Modul	35 mm x 35 mm

Table 1: F&S Board Families

Linux is available for all of these platforms. F&S combines releases for platforms with the same CPU – or rather SoC (System on Chip) – as so-called *architecture releases*. All the boards of the same architecture can use the same sources, and the binaries can be used on any board of this architecture. Please note the difference: *board families* are grouped by form factor, *architectures* are grouped by CPU type, i.e. they usually contain boards of different families.

Table 2 shows all the architectures that are currently supported by F&S.

Architecture	CPU	Platforms
fsimx6	NXP i.MX6	efus, QBliss, armStone, PicoMOD, NetDCU
fsimx6sx	NXP i.MX6-SoloX	efus, PicoCOM, PicoCore80
fsimx6ul	NXP i.MX6-UltraLite	efus, PicoCOM, PicoCore80
fsimx7ulp	NXP i.MX7ULP	PicoCore80
fsimx8mm	NXP .IMX8MM	PicoCore, OSM
fsimx8mp	NXP i.MX8MP	armStone, efus, PicoCore, SMARC
fsimx8ulp	NXP i.MX8ULP	OSM, PicoCore, SolderCore, armStone
fsimx93	NXP i.MX93	OSM, PicoCore

Table 2: F&S Architectures

1.2 Scope of this Document

This document describes the *fsimx8ulp* architecture. That means all F&S boards and modules based on the NXP i.MX8 ULP SoC. The steps in this document will help you getting to know your board and do some basic operations in Linux, so that you can try out all the periphery and do some first tests and comparisons.

The additional document `LinuxOnFSBoards_eng.pdf` explains the more generic ideas and concepts of Linux on F&S boards and modules. So after having become acquainted with the board, you should continue reading that Linux document to get a more in-depth know- ledge of the board and software.

2 Setting up the Board

In this chapter we will show how to connect the board to the PC. For a first test of the board functions, we only need a serial connection between PC and board. So as a first step, we will introduce all the boards and Starterkits of the *fsimx8ulp* architecture and show the location of all connectors, especially the debug port.

2.1 PicoCoreMX8ULP - Starterkit

The PicoCore Starterkit includes all components that are required for an initial setup. This includes:

- Cables (ethernet, serial, power, USB, …).
- Software (source, binaries, install scripts, examples).
- Starterkit carrier board that offers connectivity for most interfaces available in PicoCoreMX8ULP.
- PicoCoreMX8ULP module.

For basic operation please make sure that the Serial Debug Port and power are connected correctly.

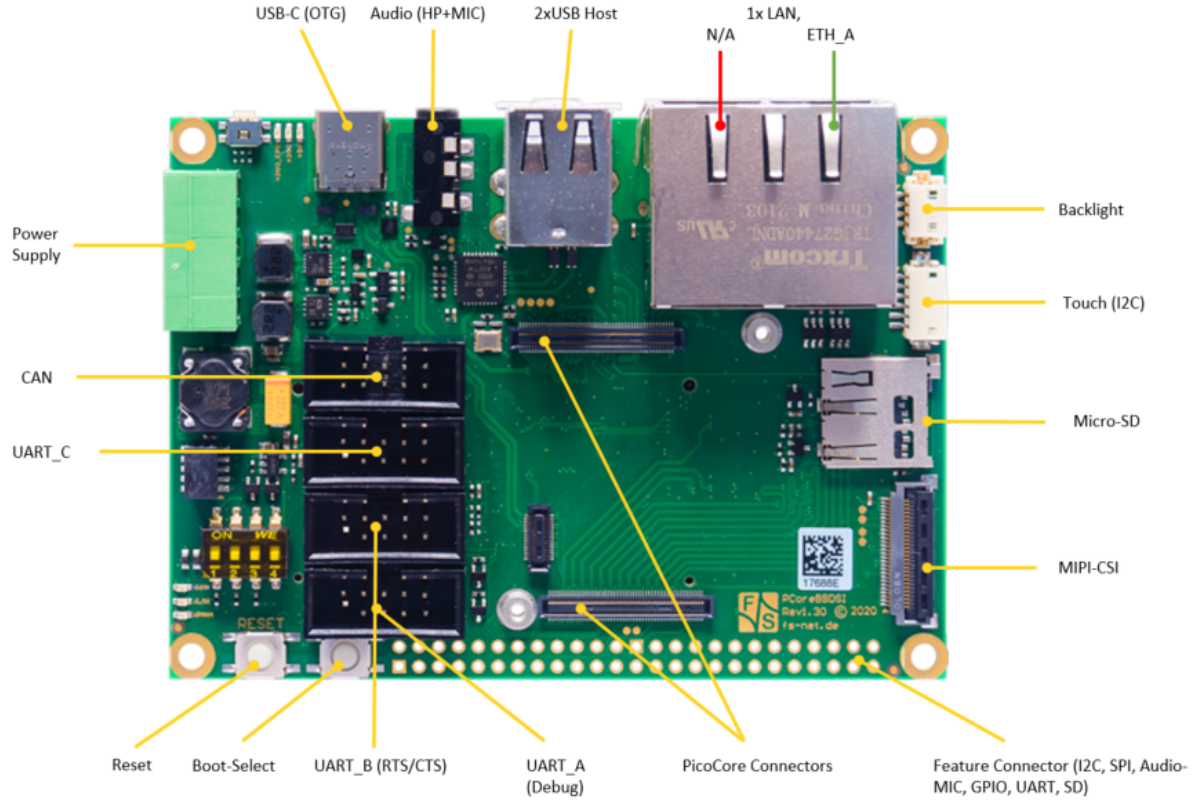


Figure 1: PicoCoreBBDSI Starterkit Top Side

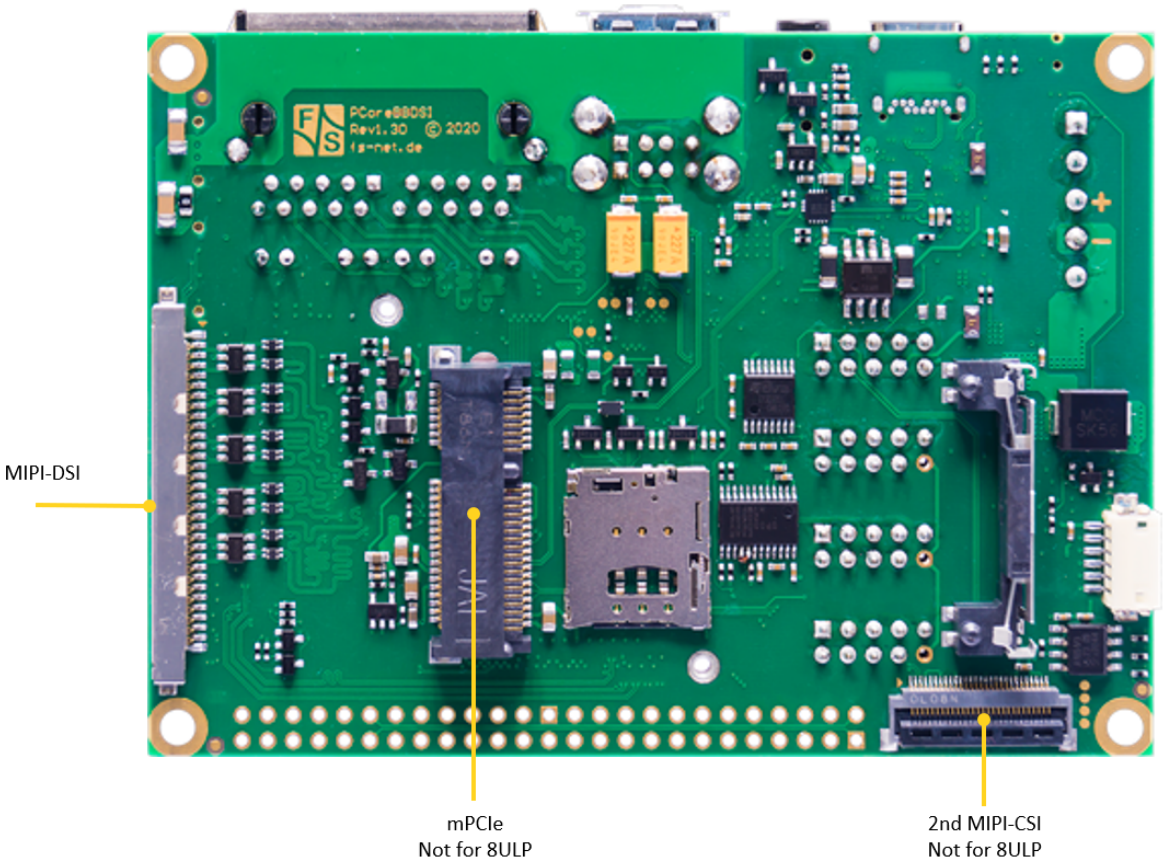


Figure 2: PicoCoreBBDSI Starterkit Bottom Side

2.2 FS-8ULP-OSM-SF Starterkit

The OSM Starterkit includes all components that are required for an initial setup. This includes:

- Cables (ethernet, serial, power, USB, …).
- Software (source, binaries, install scripts, examples).
- Starterkit carrier board that offers connectivity for most interfaces available in ADP-OSMBB2.
- FS 8ULP OSM-SF solderd on ADP-OSMBB2
- ADP-OSMBB2 is the carrier for all OSM-SF Modules.
  It provides compatible Interfaces to PicoCOreBBDSI.

For basic operation please make sure that the Serial Debug Port and power are connected correctly.

Figure 3: Starterkit FS 8ULP OSM-SF

2.3 Serial Connection

To work with the board, you need a serial connection with your PC. Use the provided Null- Modem cable and connect the debug port of the board (or Starterkit baseboard) with the serial port of a PC. Please refer to chapter 2.1 and 2.2 for the location of the COM ports. A serial port is mandatory on your PC, because we control the whole board via the serial port. If your PC does not provide a serial port, you have to either use a USB-to-serial adapter or you need to install a PCIe extension card with a serial port.

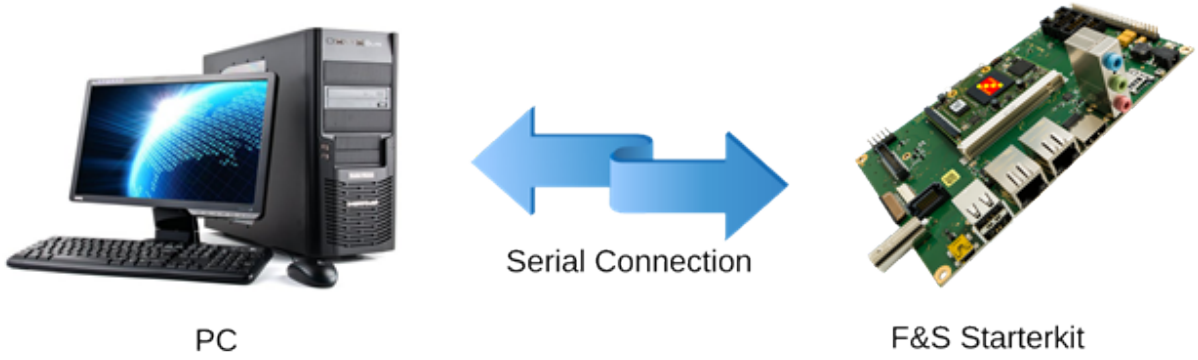


Figure 4: : Serial connection from board to PC

For a first test, a Linux PC is not necessarily required. You can also use a Windows PC. But later for development, you definitely need a Linux PC, either native or as a Virtual Machine. With a Virtual Machine, you compile your software in Linux but you can still have the serial connection done in Windows and use tools from Windows. This uses the best of both worlds.

On your PC, start a terminal program and open a serial connection to the board. Use 115200 baud, 1 start, 1 stop bit, no flow control. We recommend a terminal program that supports a 1:1 binary download and also supports ANSI Escape Sequences for color and text highlighting. Examples are:

- `TeraTerm` (Windows)
- `PuTTY` (Windows/Linux, does not support 1:1 download)

2.4 Start Board

Connect a power supply to the board. Please refer to chapter 2.1 for the location of the power supply pins. You need to supply +5V.

Now switch on the power supply. Quite immediately the terminal program should show boot messages from the booting Linux system. This will go on for a few seconds and then a login prompt should appear.

```
NXP i.MX Release Distro 6.1-mickledore fsimx8ulp ttyLP1
fsimx8ulp login:
```

Enter `root` to log in. In the default configuration, no password is required.

If everything went well, you could skip the next chapter and proceed with entering Linux commands.

3 Software Installation

When you get a Starterkit from F&S, the Linux system is usually pre-installed and boots to the Linux login prompt right away. In this case you can skip this chapter. But if you are switching over from a different operating system, if you are upgrading from a previous release, or if your board is empty for some other reason, the following sections describe how to install some standard software on your platform.

3.1 Build Release from GitHub

It is recommended to use the F&S Development Machine based on Fedora to build a Yocto Image.

3.1.1 Download manifest repository

```
git clone -b fsimx8ulp-Y2025.09-pre\
    https://github.com/FSEmbedded/releases-fus.git
```

A list of current software releases with download links can be found here:
https://fs-net.de/en/imx8ulp#panel-5

3.1.2 Prepare build environment

Run setup-yocto to prepare your build environment. The script will read the repo manifest.xml file and syncs all repositories that are needed for Yocto.

```
cd release-fus
./setup-yocto <yocto-env>
```

< yocto-env > is the name of the directory where the repositories will be placed.

Configure Yocto

```
cd ~/<yocto-env>/yocto-fus
MACHINE=fsimx8ulp DISTRO=<distro> source fus-setup-release.sh
```

Please note that this script needs to be sourced, which means it must be run in the current shell to be able to modify the existing environment. NXP uses the Yocto concept of distros to differentiate between the possible display solutions.

F&S handles this in a similar way, but as we have our own layer we also use our own distro names. However they simply replace “fsl” with “fs-imx8ulp”. See following Table for a list of possible values.

<distro>	Meaning
fus-imx-wayland	Use Wayland graphics
fus-imx-xwayland	Use Wayland with X11 support (no EGL on X11 applications)

Table 3: Yocto distros for fsimx8ulp

3.1.3 Build Yocto

```
bitbake <image-name>
```

where <image-name> is one of the images listed below.

Image name	Target
core-image-minimal	A small image that is optimized for very small memory usage
imx-image-core	i.MX image with i.MX test applications to be used for Wayland backends.
imx-image-multimedia	i.MX image with a GUI without any Qt content.
imx-image-full	Builds an opensource Qt 6 image
fus-image-std	F&S default image with Weston GUI
fus-image-qt6	F&S image with QT6 support

Table 4: Yocto images for fsimx8ulp

3.1.4 Deployed Images

Yocto creates a *"<image-name>.sysimg"* image which contains a partition table, boot-fs and root-fs partition. In addition, "*Firmware"* contains the boot-firmware like nboot.fs and uboot-info.fs, OPTEE-OS, ATF, M33 application, UPower Firmware and Secure Enclave Firmware.

You can find the images in:

```
~/<yocto-env>/yocto-fus/build-fsimx8ulp-<distro>/
tmp/deploy/images/fsimx8ulp/
```

3.2 Flash new Images

There are multiple ways to flash a new Image on a target board. The easiest way to flash a new release is while using the UUU-Tool (formally known as mfgtool). You can find the newest release at "My F&S" in the Download area for PicoCoreMX8ULP, OSM8ULP, armStone8ULP, etc.

The easiest way to install software, is by using our FSInstaller tool. The tool is available for Windows and Linux. You can find the tool at "My F&S" in the download area.

Alternatively, NBOOT, U-BOOT and the .sysimg image can be written directly to the eMMC via U-Boot.

3.2.1 Flash NBOOT via cmd fsimage

```
# Place nboot.fs in $loadaddr
# Load via TFTP
=> setenv serverip <server-ip addr>
=> setenv ipaddr <board-ip-addr>
=> tftp $loadaddr nboot.fs

#Load via USB
=> usb start # or => usb reset
=> load usb $loadaddr nboot.fs


#Flash NBOOT
=> fsimage save
```

3.2.2 Flash U-BOOT via cmd fsimage

```
#Place uboot.fs in $loadaddr
#Load via TFTP
=> tftp $loadaddr uboot.fs


#Load via USB
Load usb $loadaddr uboot.fs


#Flash Uboot
=> fsimage save
```

3.2.3 Flash flash.fs via cmd fsimage

flash.fs is a concatenation of nboot.fs + uboot.fs

This can be used to update NBOOT + UBoot in one step:

```
#Place flash.fs in $loadaddr
#Load via TFTP
=> tftp $loadaddr flash.fs

#Load via USB
Load usb $loadaddr flash.fs

#Flash NBOOT + UBOOT
=> fsimage save
```

Note:

The SolderCoreBBHD needs the ID pin to act as a USB Host-Device. Devices like USB-Sticks will not work without jumpered USBxID. Please see hardware documentation of SolderCore for more details.

3.3 Enter UBoot

The SolderCore8ULP or PicoCoreMX8ULP does not support NBoot so the first-level bootloader is UBoot. To enter UBoot it requires the serial setup as explained in Chapter 2.1. After that we can turn on the power and the following messages should appear.

```
U-Boot 2022.04-F+S+g47e565245 (Jan 19 2024 - 13:25:52 +0000)
M33 Sync: OK
CPU:   i.MX8ULP rev1.1 at 960 MHz
CPU current temperature: 34
Reset cause: WARM-WDG
Boot mode: Single boot
Model: F&S SolderCore8ULP
DRAM:  992 MiB
Core:  33 devices, 18 uclasses, devicetree: separate
MMC:   FSL_SDHC: 0
Loading Environment from MMC...

In:    serial
Out:   serial
Err:   serial
SEC0:  RNG instantiated
switch to partitions #0, OK
mmc0(part 0) is current device
flash target is MMC:0

Fastboot: Normal
Normal Boot
Hit any key to stop autoboot:  0
```

You have to hit any key within 3 seconds to enter UBoot.

3.4 Set MAC Address

By default, F&S has already installed the correct MA address. The MAC address is stored in U-Boot environment. The MAC address is also used as serial number of the board. In case of repair or to enable software access, you need the MAC (serial number) address on the sticker. So don't remove the sticker.

The following procedure is only necessary in case U-Boot environment is completely erased.

When we erase the U-Boot environment including the MAC address for the Ethernet chip. We have to set it again and save it permanently.

The MAC address is a unique identifier for a network device. Each network device has its own address that should be unique across the whole world. So each network port on each board needs a unique MAC address.

A MAC address consists of twelve hexadecimal digits (0 to 9 and A to F), that are often grouped in pairs and separated by colons. The first six digits for F&S boards are always the same: 00:05:51, which is the official MAC address code for the F&S company. The remaining six digits can be found on the bar-code sticker directly on your board.

Figure 5: Barcode sticker

The full MAC address for this example would be 00:05:51:07:93:4B. If your board supports two ethernet ports, you need two MAC addresses. The second one is the first one plus 1, i.e. 00:05:51:07:93:4C.

The following two commands will set the MAC addresses and stores the current environment (including the newly set MAC addresses) in NAND flash. Of course you have to replace `xx:yy:zz` with the six hex digits from the bar-code sticker on your board (and xx:yy:vv with the six hex digits plus 1).

```
setenv ethaddr 00:05:51:xx:yy:zz
saveenv
```

Warning

If you do not set this unique address, a random address is generated by U-Boot.

3.5 Restart Board

Installation is complete. To check if everything was done correctly, restart the board. You can either enter U-Boot command, …

```
reset
```

… or press the reset button, or simply switch the power off and on again. Like in chapter 2.3, the terminal program should show boot messages from the booting Linux system. This will go on for a few seconds and then a login prompt should appear.

```
fsimx8ulp login:
```

4 Using the Standard System and Devices

By default, the standard Buildroot root filesystem is mounted read-only and the Yocto root filesystem is mounted read-write. For read-only root filesystems you can not create files unless you go to a directory like `/tmp` that is located in a RAM disk. This is to make the system as stable as possible. If the root filesystem is mounted read-only, it is usually no problem to just switch off the power. So you have to be more careful on Yocto.

If you want to remount the filesystem in read-write mode, just say

```
mount -o remount,rw /
```

Note the slash `/` that is denoting the mount point of the root directory. Now you can create files everywhere. But remember that written data is often buffered in RAM first and is not immediately stored on the media itself. If you simply switch off the power now, data that was still buffered in RAM may be lost. So in this case it is really important to actually shut down the system with ...

```
halt
```

… or restart with:

```
reboot
```

Or you can remount the root filesystem in read-only mode again after applying the changes:

```
mount -o remount,ro /
```

All these commands will force the system to actually write any buffered data to the media.

The `/dev` directory is also built on top of a RAM disk. This allows the kernel to create and remove device entries dynamically. For example if a USB stick is plugged in, a new device entry `/dev/sda1` is automatically created. And when the USB stick is unplugged, the device entry is also automatically removed again.

4.1 procfs

Linux has a virtual filesystem called Procfs. It is mounted under `/proc` and provides information about the system in general and about each process that is currently active.

Get information about the CPU

```
cat /proc/cpuinfo
```

Show the Linux version

```
cat /proc/version
```

Show the current memory usage

```
cat /proc/meminfo
```

List the supported filesystems

```
cat /proc/filesystems
```

4.2 sysfs

Sysfs is another virtual file system in Linux. It exports information about devices and drivers from the kernel device model to user space. Which means you can get information about current device settings and some drivers even allow configuring the device at runtime.

Devices that want to share information or want to accept configuration settings, create subdirectories under the `/sys` directory. Then virtual text files are used to pass the information. So for example if a touch panel can accept some sensitivity configuration, it would create a file `sensitivity` there. By reading data from the file, you could query the current setting. And by writing a new value to the file, you could set a new sensitivity value.

For example access the RTC subsystem:

```
cat /sys/class/rtc/rtc0/date
```

Show the CPU core temperature (in 1/1000 °C):

```
cat /sys/class/thermal/thermal_zone0/temp
```

4.3 USB Stick (Storage)

If a USB memory stick is inserted, it is available like a standard hard disk. Because there is usually no real hard disk connected, it is found as `/dev/sda`. If you have partitions on your USB stick, you have to access them as `/dev/sda1`, `/dev/sda2` and so on.

You can mount and unmount all the partitions now. For example to mount the first partition on directory `/mnt`, you have to issue the following command:

```
mount /dev/sda1 /mnt
```

To unmount again, issue:

```
umount /mnt
```

Remarks

If a USB storage device contains more than one partition, a device entry will be created for each partition, for example also `/dev/sda2` and `/dev/sda3`. In fact also a device entry `/dev/sda` without a number is available, that refers to the whole device, including all partitions. Some USB storage devices do not contain a partition table at all. Then only `/dev/sda` is created.

If more than one storage device is plugged in (for example via a USB hub), then the second device has the base name `sdb`, the third `sdc`, and so on.

4.4 Qt6

Qt is a cross-platform application framework that is widely used for developing applications, often with a graphical user interface (GUI). You can build Qt libraries with fus-image-qt6.

4.5 Wayland/Weston

Wayland is a GUI protocol that replaced X11. Wayland itself only manages the protocol and the communication to the clients. It needs an additional component, the so-called compositor. This compositor works like a Window Manager and actually presents the graphical output on the display.

The Yocto release uses weston as wayland compositor.

4.6 Ethernet

To activate the Ethernet port in Linux, you have to configure the network device first. For example to use IP-Address 10.0.0.242, you can use the command

```
ip addr add 10.0.0.242/24 dev eth0
```

Then you can use network commands, e.g.

```
ping 10.0.0.121
```

There is also a DHCP client included. To receive an IP address via DHCP just call:

```
udhcpc
```

If your board supports more than one network interface, you can add option `-i` to specify the appropriate interface. For example to request IP data for interface `eth1`:

```
udhcpc -i eth1
```

4.7 TFTP

There is a small program to download a file from a TFTP server. This can be rather useful to get some files to the board without having to use an SD card or a USB stick. For example to load a file `song3.wav` from the TFTP server with IP address 10.0.0.121, just call

```
tftp -g -r song3.wav 10.0.0.121
```

4.8 SSH

Ls /In Yocto ssh is configured to allow root login and empty-password by default. Just connect via SSH by any host in the network with:

```
ssh <username>@<device-ip>
```

You can change these settings at:

```
vi /etc/ssh/sshd_config
```

4.9 Serial

On NXP CPUs, the devices are called `/dev/ttyLP<n>`, where `<n>` is a number starting with 0. One port is usually used as serial debug port where all console messages are sent to. This one port runs at 115200 bit/s. All other ports are at 9600 bit/s by default. Use the `stty` program to change this.

To access a serial port from the command line, you can use input and output redirection.

Show a string on port `ttyLP2`:

```
echo Hello > /dev/ttyLP2
```

Show characters that arrive on port `ttyLP2`:

```
cat < /dev/ttyLP2
```

Usually character input is line buffered, so you will only see information after sending Return.

Remark

The default setting for serial ports in Linux echo each character that arrives. So if you connect one serial port to a second serial port with a Null-Modem cable, sending a single character will result in an endless loop. Each side will echo the character indefinitely. You can use `stty` to change this behaviour.

4.10 I²C

Most devices on an I²C bus are accessed by a device driver in Linux. But you can also have access to additional devices from user space software. There are even command line tools to do this. The following examples are from an SolderCore8ULP.

Show the available I²C buses:

```
i2cdetect -l
i2c-0   i2c           i2c-rpmsg-adapter               I2C adapter
i2c-1   i2c           i2c-rpmsg-adapter               I2C adapter
i2c-4   i2c           29370000.i2c                    I2C adapter
i2c-7   i2c           29850000.i2c                    I2C adapter
```

Show the available devices on bus `i2c-0`:

```
i2cdetect -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: -- -- -- -- -- -- -- --
```

So there are no devices on `i2c-0`. Some devices are handled by a Linux driver, so they can not be accessed from user space (therefore marked as “used” with `UU`). Now you can read and write data with `i2cget` and `i2cset`, or read whole data areas with `i2cdump`.

4.11 GPIO

You can setup and use GPIOs with the libgpiod and provided tools.

```
$ gpiodetect
```

```
gpiochip0 [imx-rpmsg-gpio-0] (32 lines)     #GPIOA
gpiochip1 [imx-rpmsg-gpio-1] (32 lines)     #GPIOB
gpiochip2 [imx-rpmsg-gpio-2] (32 lines)     #GPIOC
gpiochip3 [2d000000.gpio] (32 lines)        #GPIOD
gpiochip4 [2d010000.gpio] (32 lines)        #GPIOE
gpiochip5 [2e200000.gpio] (32 lines)        #GPIOF
```

Example

On SolderCore8ULP, use pin PTF3 as output pin.

```
#Set Output to 1
gpioset -c gpiochip3 3=1
```

Now the pin should have a high level (about 3.3V or 1V8) which you can measure with a voltmeter.
To set pin low again type:

```
# Set Output to 0
gpioset -c gpiochip3 3=0
```

To set the Pin as input, just run:

```
gpioget -c gpiochip3 3
```

4.12 RTC

Setting date:

```
date "2015-11-29 22:55"
```

Save current date to RTC:

```
hwclock -w
```

The time will automatically be loaded from the RTC at the next boot.

Note

SolderCore8ULP has an internal RTC. Make sure VBAT is connected to the module. Otherwise the RTC cannot keep time.

5 Next Steps

This document only showed a very basic usage of the board and the Linux system. The next logical step is the generic Linux documentation `LinuxOnFSBoards_eng.pdf`. It will show you the ideas and concepts behind the F&S Linux environment and how you can work efficiently with these boards.

5.1 F&S Workshops

F&S also offers several workshops. Especially if you are new to working with embedded boards or even new to Linux, we recommend visiting the workshop “Linux on F&S Modules”. Working with an embedded system is quite different to working with a desktop Linux. This workshop will show you a basic introduction to Linux, how to use NBoot, U-Boot and Linux on an F&S board, how to compile the system software, how to download files to the board, and how to write your own programs. The workshop lasts four hours and can be done virtually (Teams) or in Stuttgart at the F&S company building. It may save you many hours of reading, trying, and even frustration.

Additional workshops are available for working with Yocto, Asymmetric Multiprocessing, Secure Boot, Working with GIT. Please look at our website for any additional offerings.

5.2 Further Information

Many additional resources of information are available on the F&S website.

Document	Description
AdvicesForLinuxOnPC.pdf	Explains how to install server software and tools on a Linux development PC that is used with F&S Linux boards.
SolderCoreBBHD Hardware eng.pdf	Hardware documentation: there are separate documents for each board and also for the Starterkit baseboards. F&S also offers Eagle layout files for some of our Starterkits.
PicoCoreMX8ULP_Hardware.pdf	Hardware documentation: there are separate documents for each board and also for the Starterkit baseboards. F&S also offers Eagle layout files for some of our Starterkits.
LinuxOnFSBoards.pdf	Shows how to use the bootloaders, Linux system and peripherals on F&S boards and modules

Table 5: Important documents, available on the F&S website

We do not include all these documents in the release to make sure that you always get the newest version when you start. The following sections give direct links to important places like documentation and add-ons.

A good source for information is also our internet forum. If you have any questions or specific problems, please feel free to go to: https://forum.fs-net.de/.

5.2.1 Resources for PicoCoreMX8ULP

Linux Release information:

https://www.fs-net.de/en/embedded-modules/computer-on-module-picocore/picocoremx8ulp/#panel-5

Hardware documentation for PicoCoreMX8ULP SoM, Starterkit baseboard, including schematics:

https://www.fs-net.de/en/embedded-modules/computer-on-module-picocore/picocoremx8ulp/#panel-6

Available accessories, adapters and extensions:

https://www.fs-net.de/en/embedded-modules/computer-on-module-picocore/picocoremx8ulp/#panel-4

5.2.2 Resources for FS-8ULP-OSM-SF

Linux Release information:

https://www.fs-net.de/en/embedded-modules/open-standard-module-osm/fs-osm-sf-mx8ulp/#panel-5

Hardware documentation for FS-8ULP-OSM-SF SoM, Starterkit baseboard, including schematics:

https://www.fs-net.de/en/embedded-modules/open-standard-module-osm/fs-osm-sf-mx8ulp/#panel-6

Available accessories, adapters and extensions:

https://www.fs-net.de/en/embedded-modules/open-standard-module-osm/fs-osm-sf-mx8ulp/#panel-4

5.2.3 Resources for armStone8ULP

Linux Release information:

https://www.fs-net.de/en/embedded-modules/single-board-computer-armstone/armstonemx8ulp/#panel-5

Hardware documentation for PicoCoreMX8ULP SoM, Starterkit baseboard, including schematics:

https://www.fs-net.de/en/embedded-modules/single-board-computer-armstone/armstonemx8ulp/#panel-6

Available accessories, adapters and extensions:

https://www.fs-net.de/en/embedded-modules/single-board-computer-armstone/armstonemx8ulp/#panel-4

5.2.4 Resources for SolderCore8ULP

Hardware documentation for SolderCore8ULP module itself, Starterkit baseboard, including schematics:

https://www.fs-net.de/en/embedded-modules/soldercore/soldercore8ulp#panel-6

Available accessories, adapters and extensions:

https://www.fs-net.de/en/embedded-modules/soldercore/soldercore8ulp#panel-4

6 Appendix

6.1 List of Figures

6.2 List of Tables

6.3 Important Notice

The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. F&S Elektronik Systeme assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained in this documentation.

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