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Building another Linux Kernel Version for SAMA5D3-EDS and EVB-KSZ9477 using EVB-LAN9646 Repository

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Title
Building another Linux Kernel Version for SAMA5D3-EDS and EVB-KSZ9477 using EVB-LAN9646 Repository

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Question
The default Linux Kernel version in the EVB-KSZ9477 Github is 4.9.143. How to build another Linux Kernel Version for SAMA5D3-EDS and EVB-KSZ9477?

Answer

Building another Linux Kernel Version for SAMA5D3-EDS and EVB-KSZ9477

> **Note:** As of this writing, the default Linux Kernel version in the EVB-KSZ9477 Github page is 4.9.143
>
> This build uses **EVB-LAN9646 Repo** (https://github.com/Microchip-Ethernet/EVB-LAN9646) which also supports **EVB-KSZ9477** and **SAMA5D3-EDS**.

Build Environment:

- Ubuntu Linux 20.04 LTS

Packages:

- `$ sudo apt-get install subversion build-essential bison flex gettext libncurses5-dev texinfo autoconf automake libtool mercurial git-core gperf gawk expat curl cvs libexpat-dev bzr unzip bc python-dev wget cpio rsync xxd bmap-tools libssl-dev`

Build Instruction:

In this example, the build targets **Linux Kernel Version v6.6** and **KSZ Switchdev** driver to be programmed in an SD Card.

1. Clone the repo EVB-LAN9646

`$ git clone` https://github.com/Microchip-Ethernet/EVB-LAN9646 (https://github.com/Microchip-Ethernet/EVB-LAN9646)

2. Use any Buildroot version

```
$ cd EVB-LAN9646/buildroot-at91-linux4microchip-2023.10
```

3. Point BR2_EXTERNAL to provide the source code location.

```
$ make BR2_EXTERNAL=../ung_apps_external atmel_sama5d3_xplained_ksz_6_6_mmc_defconfig
```

> **Note:** The `atmel_sama5d3_xplained_ksz_6_6_mmc_defconfig` builds
>
> - Linux Kernel version 6.6
> - Switchdev driver
> - for SD card (mmc)
>
> List of defconfigs is found in `../ung_apps_external/configs`
>
> `$ ls ../ung_apps_external/configs`

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4. Edit the Buildroot .config file as needed.

```
$ make menuconfig
Kernel --> Kernel configuration (Using an in-tree defconfig file)  --->
  | | (sama5_ksz) Defconfig name
  | | (microchip/at91-sama5d3_xplained_ung8087) In-tree Device Tree Source file names
```

> **Note:** Linux config
> **`sama5_ksz`** *defconfig for switchdev driver*
> **`sama5_ksz_dsa`** *defconfig for dsa driver*

> **Note:** Device Tree Source (dts)
> **`at91-sama5d3_xplained_ung8071`** *for EVB-KSZ9477*
> **`at91-sama5d3_xplained_ung8087`** *for SAMA5D3-EDS*

5. Build

```
$ make -j8
```

6. Edit the Linux config file as needed, e.g. adding drivers.

```
$ make linux-menuconfig

> Device Drivers > Network device support > Ethernet driver support > Drivers for Microchip KSZ switc
  | |         --- Drivers for Microchip KSZ switches                                        | |
  | |     *** Microchip KSZ switch device drivers ***                                       | |
  | |     <*>   SPI driver for Microchip KSZ8463 switch                                     | |
  | |     <*>   I2C driver for Microchip KSZ8863 switch                                     | |
  | |     <*>   SPI driver for Microchip KSZ8863 switch                                     | |
  | |     <*>   SPI driver for Microchip KSZ8795 switch                                     | |
  | |     <*>   SPI driver for Microchip KSZ8895 switch                                     | |
  | |     <*>   I2C driver for Microchip KSZ9897 switch                                     | |
  | |     <*>   SPI driver for Microchip KSZ9897 switch                                     | |
  | |     [*]   IBA support                                                                 | |
  | |     [*]   AVB support                                                                 | |
  | |     [*]   MRP support                                                                 | |
  | |     [*]     MSRP support                                                              | |
  | |     [ ]   MSTP support                                                                | |
  | |     [*]   DLR support                                                                 | |
  | |     [*]   HSR support                                                                 | |
  | |     [*]     Use new code from 6.1                                                     | |
```

7. Rebuild

```
$ make linux-rebuild
$ make -j8
```

The SD card image `sdcard.img` is located at:
`./output/images`
Program the image using **`Balena Etcher`**

Verification:

Boot the SAMA5D3-EDS with the SD card image

1. Log-in as Root

```
buildroot login: root
#
```

2. Show Linux Version

```
# uname –a
Linux buildroot 6.6.23-linux4microchip-2024.04 #2 Fri May  2 11:07:45 PST 2025 armv7l GNU/Linux
```

3. Show that the KSZ driver is loaded and enumerated.

```
# dmesg | grep ksz
i2c_ksz9897: i2c_transfer() failed
ksz9897 2-005f: failed to read device ID(0x0)
ksz9897 spi0.0: chip id 0x00989360
```

4. Test the Ethernet interface.

Connect the Ethernet to the Internet and then ping:

```
# ping google.com (http://google.com)
```

5. Read ID Register using **`regs_bin`**

```
# regs_bin /sys/bus/spi/devices/spi0.0/
reg> rb 0x0001
0001: 98
reg> rb 0x0002
0002: 93
reg>
```

URL Name

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Devices

KSZ9477, KSZ9563, KSZ9893, KSZ9897, KSZ8683