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Instructions for Building EVB-KSZ9477 Image (Kernel version 5.x and Above)

This article provides instructions for Building EVB-KSZ9477 Image.

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Title

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Question

What are the recommended steps and considerations for building the kernel image for EVB-KSZ9477 with version 5.x and above (I2C and SPI)?

Answer

Building the image for EVB-KSZ9477 kernel version 5.x and above involves several steps and considerations.

The [legacy repository \(https://github.com/Microchip-Ethernet/EVB-KSZ9477\)](https://github.com/Microchip-Ethernet/EVB-KSZ9477) for EVB-KSZ9477 offers the default build image for the local Linux kernel version 4.9.143. However, for Linux kernel versions 5.15 and above, users may encounter issues, particularly with I2C functionality, when applying patches based on the linux4microchip-2022.10. These patches, while intended to support newer kernel versions, may lead to errors such as I2C probe failures.

Furthermore, for Linux versions equal to or greater than 6.1, it is recommended to utilize an updated version of Buildroot. The existing EVB-KSZ9477 repository requires users to manually copy and patch various source files before initiating the build process, which can be error-prone and time-consuming.

To mitigate these issues, a new GitHub repository ([EVB-LAN9646 \(https://github.com/Microchip-Ethernet/EVB-LAN9646\)](https://github.com/Microchip-Ethernet/EVB-LAN9646)) has been set up to host the KSZ Linux source code with the latest Buildroot patches. It is strongly recommended that customers use this repository to ensure a smoother build process without any build-related complications.

Below are the prescribed steps to build an image for kernel version 5.15 as an example, with SPI and I2C on EVB-KSZ9477:

For I2C:

Hardware Configuration:

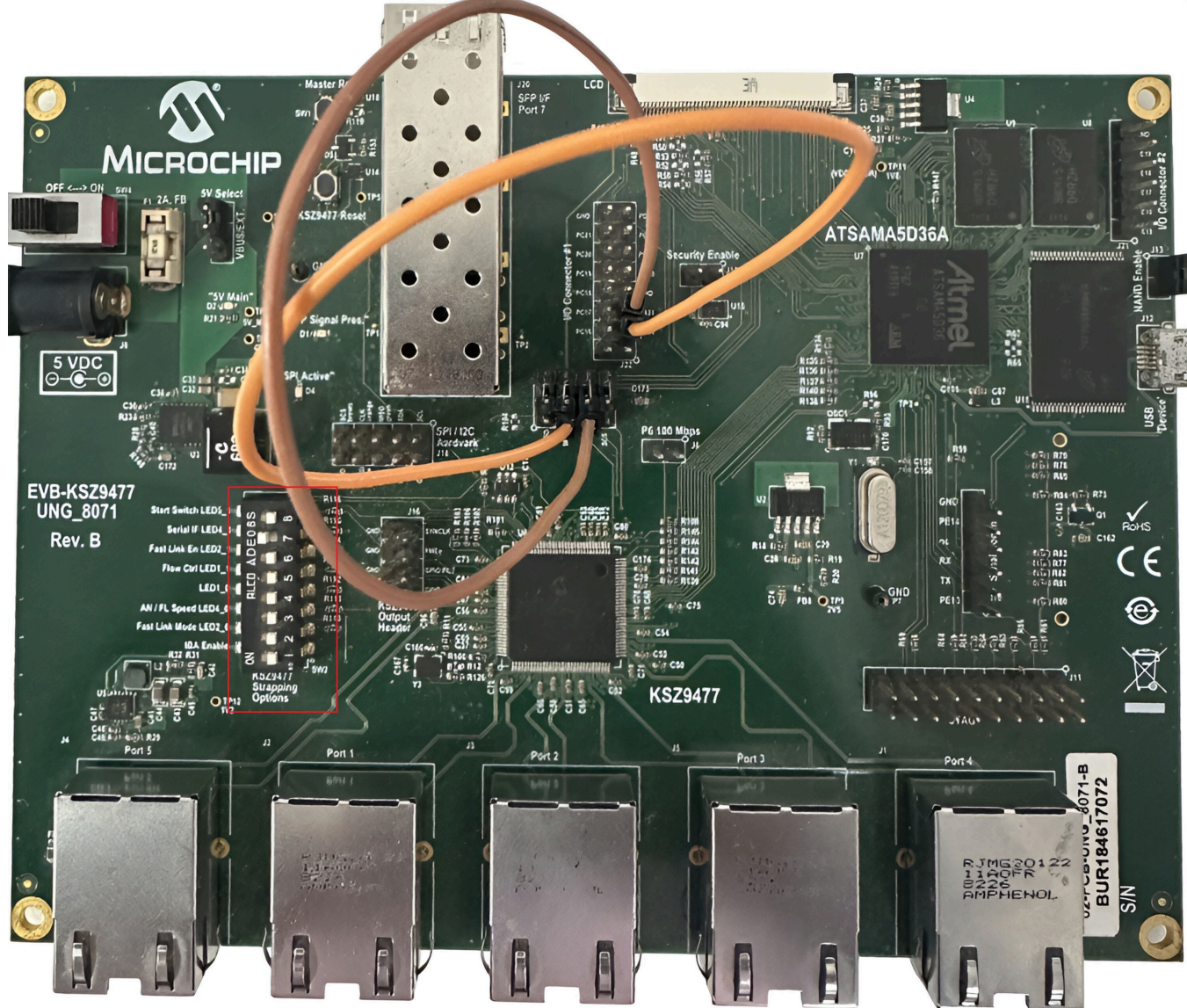
- Remove all four jumpers from J19 to disconnect the ATSAM5D3 SPI bus from KSZ9477.
- Establish connections as follows:
 - Connect IO Connector pin 3 (PA30_TWD0) to MOSI J19-pin 3 (or Aardvark header pin 3).
 - Connect IO Connector pin 5 (PA31_TWCK0) to SCLK J19-pin 5 (or Aardvark header pin 1).
- Close DIP switch 7 from SW2 to select I2C mode. Ensure all other DIP switches remain open.

Refer to the image below for hardware configuration details:

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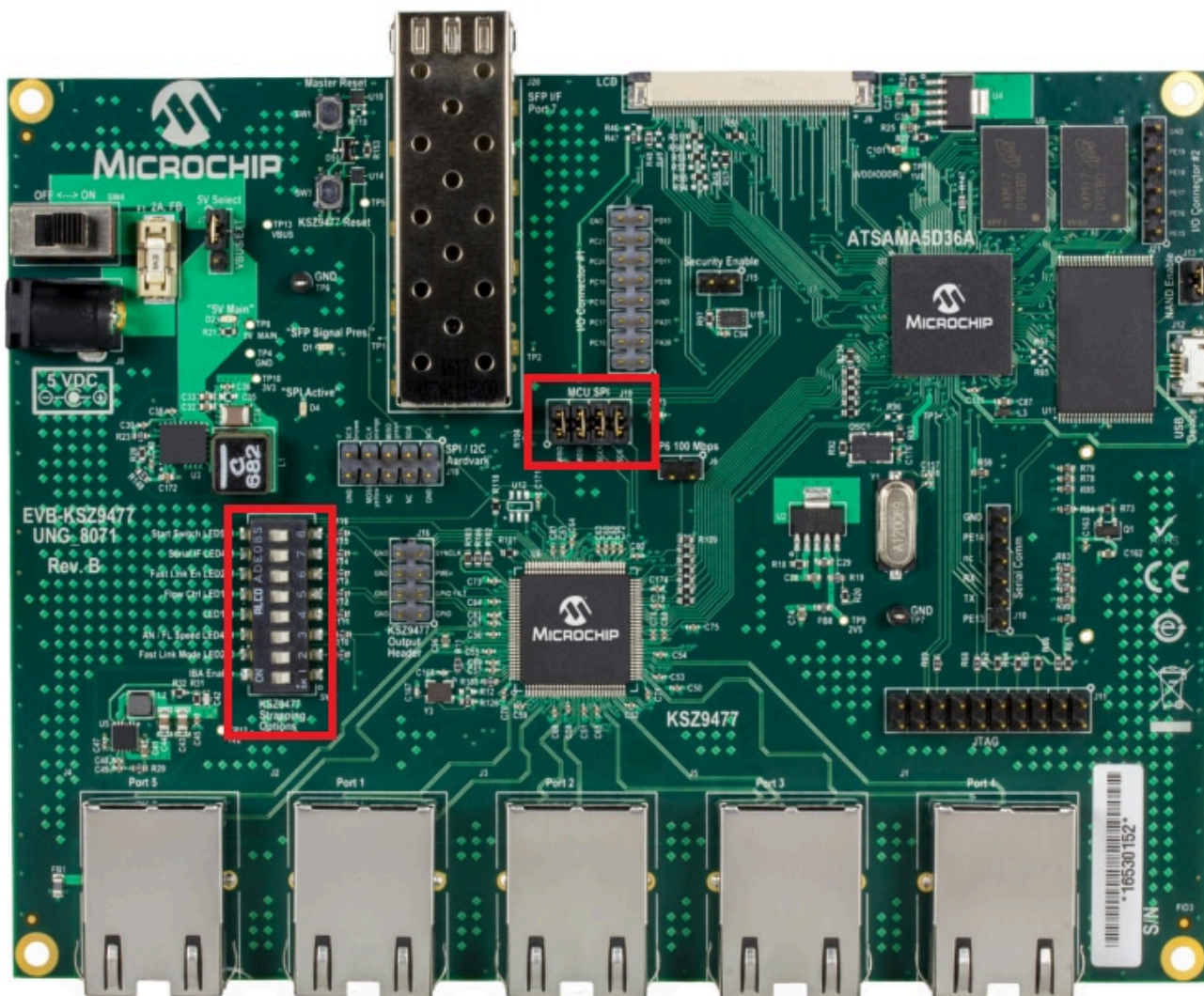


For SPI:

Hardware Configuration:

- Ensure that all four jumpers from J19 are closed.
- Ensure DIP switch 7 from SW2 is in the OFF/OPEN position to select SPI mode.

Refer to the image below for hardware configuration details:



Software Build Instructions:

- Retrieve the EVB-LAN9646 repository from GitHub:

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

- Navigate to the buildroot folder:

```
$ cd EVB-LAN9646
```

```
$ cd buildroot-at91-linux4sam-2022.10
```


For SD card:

- Perform an out-of-tree build for version 5.15 of ksz9477 using linux4microchip 2022.10:

```
$ BR2_EXTERNAL=../ung_apps_external make O=ksz9477_5.15
atmel_sama5d3_xplained_ksz_5_15_mmc_defconfig
```

For NAND flash:

- Perform an out-of-tree build for version 5.15 of ksz9477 using linux4microchip 2022.10:

```
$ BR2_EXTERNAL=../ung_apps_external make O=ksz9477_5.15
atmel_sama5d3_xplained_ksz_5_15_defconfig
```

- Change directories to the out-of-tree folder, and initiate the build:

```
$ cd ksz9477_5.15
$ make
```

For SD Card:

- Upon completion of the build process, the output image should be available in ***./images/sdcard.img***

For NAND Flash programming:

- Connect the micro-USB (J12) connector of the EVB-KSZ9477 to the Linux PC.
- Apply 5V power to the EVB-KSZ9477 board.
- Remove the NAND enable (J13) jumper and press the Master Reset button (the /dev/ttyACM0 is created, observable via the command '\$ tail -f /var/log/kernel.log').
- Reinsert the NAND enable (J13) jumper.
- Execute the flash.sh (<http://flash.sh>) script:

```
$ sudo ./flash.sh (http://flash.sh)
```

For comprehensive instructions on programming the EVB-KSZ9477 on-board NAND flash and preparing a bootable SD card, refer the [EVB-KSZ9477_Image_Programming_Guide.pdf](https://github.com/Microchip-Ethernet/EVB-KSZ9477/releases/download/v1.2.1/EVB-KSZ9477_Image_Programming_Guide.pdf). (https://github.com/Microchip-Ethernet/EVB-KSZ9477/releases/download/v1.2.1/EVB-KSZ9477_Image_Programming_Guide.pdf)

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Devices

KSZ9477, LAN9646