

Building Armbian image for GW-08 from sources.

Compiling image from sources.

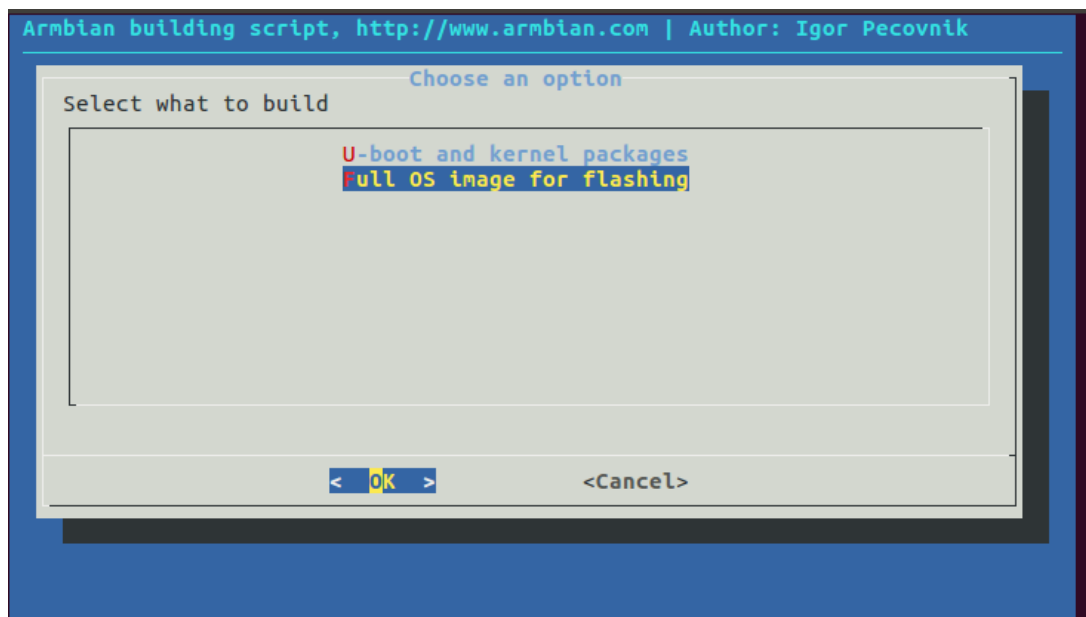
Clone Armbian OS project:

```
git clone --depth 1 https://github.com/armbian/build  
cd build
```

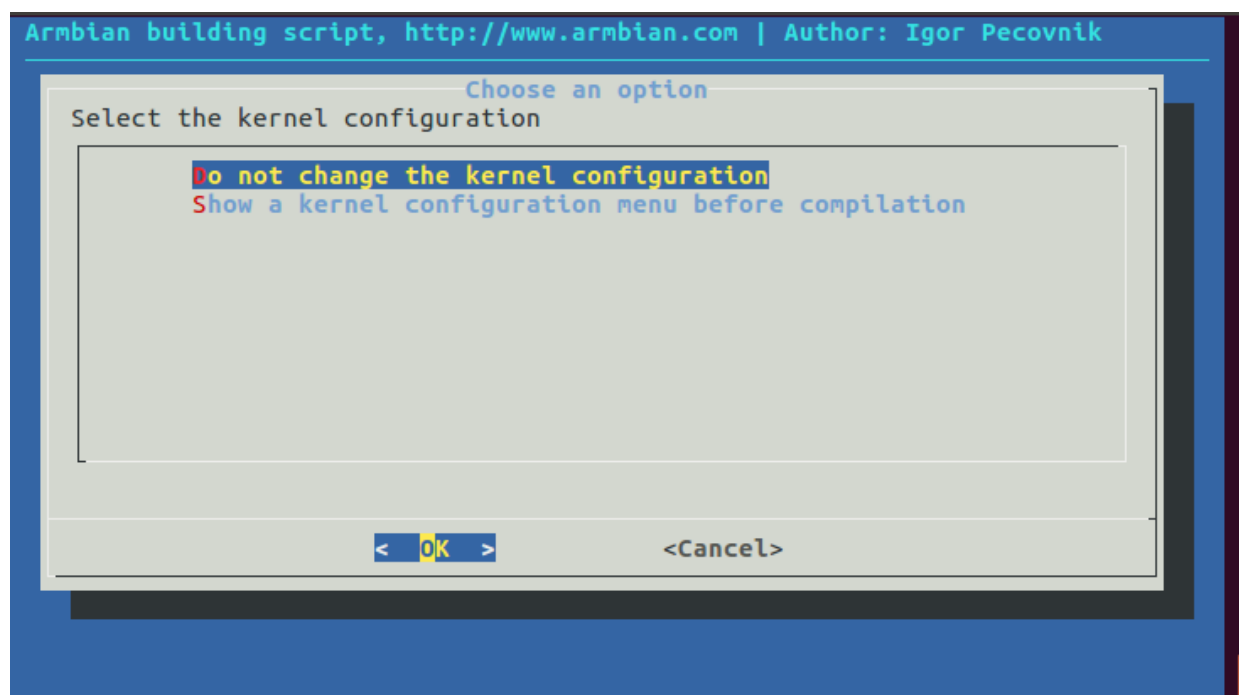
Run following command to compile image.

```
./compile.sh
```

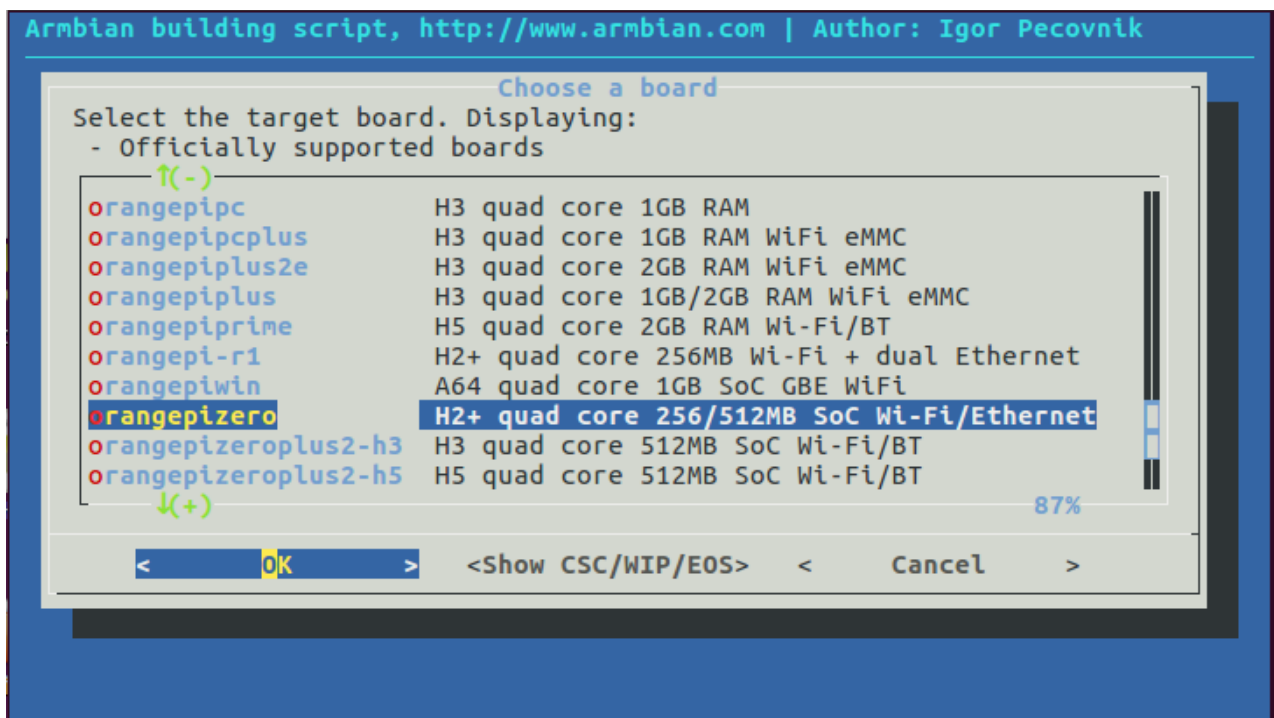
But before compilation process following window will appears:



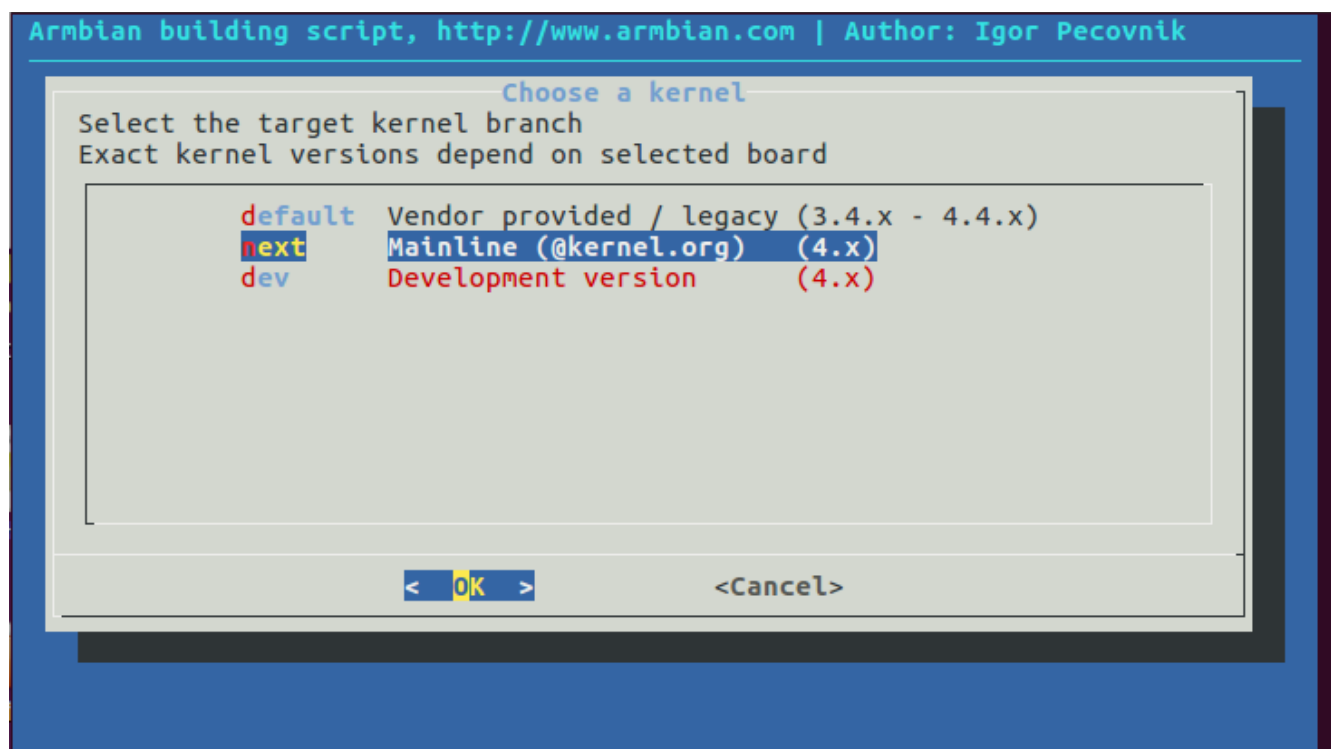
Select «Full OS image for flashing» and press «Ok». In following choose «Do not change the kernel configuration»:



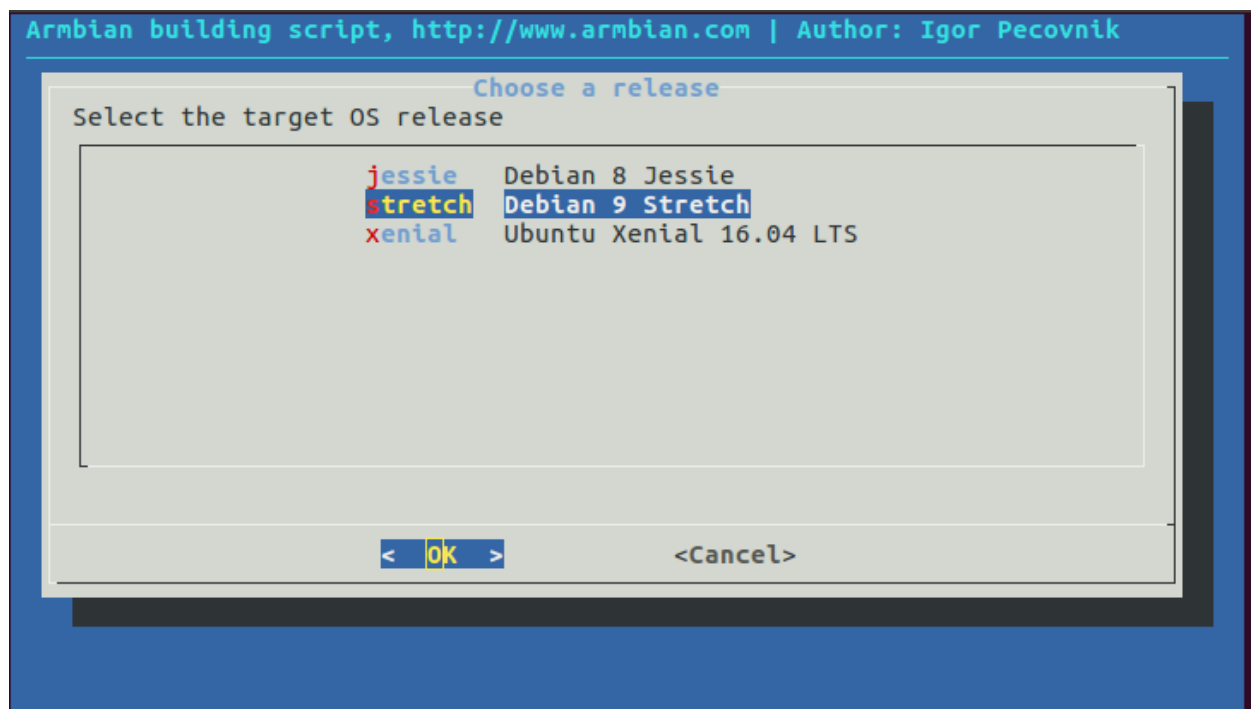
Then select «orangepi-zero» configuration:



«Mainline» kernel branch:



«stretch» release:



Then compilation process will be started. You need to wait while it will be finished. At the end of this process you should see following:

```
[ o.k. ] Free space: [ SD card ]
Filesystem      Size  Used Avail Use% Mounted on
udev             16G   0    16G   0% /dev
tmpfs            3,2G  9,5M  3,2G   1% /run
/dev/sda2        409G  295G  93G   77% /
tmpfs            16G  194M  16G    2% /dev/shm
tmpfs            5,0M   4,0K  5,0M   1% /run/lock
tmpfs            16G   0    16G   0% /sys/fs/cgroup
/dev/sda1        511M   5,9M  506M   2% /boot/efi
tmpfs            3,2G   88K  3,2G   1% /run/user/1000
/dev/sdc1        1,9G   0    1,9G   0% /media/83/0403-0201
tmpfs            21G  830M  21G    4% /home/83/0403-0201/linux/orangepi/armbian/build/.tmp/rootfs-next-orangepizero-stretch-no
/dev/loop0p1     1,1G  845M  196M  82% /home/83/0403-0201/linux/orangepi/armbian/build/.tmp/mount-next-orangepizero-stretch-no
[ o.k. ] Writing U-boot bootloader [ /dev/loop0 ]
[ o.k. ] Done building [ /home/83/0403-0201/linux/orangepi/armbian/build/output/images/Armbian_5.41_Orangepizero_Debian_stretch_next_4.14.40.img ]
[ o.k. ] Runtime [ 72 min ]
```

There is image to write on microSD card.

Flashing image in microSD card.

```
sudo dd if=output/images/Armbian_5.41_Orangepizero_Debian_stretch_next_4.14.40.img
of=/dev/sdx
```


Where /dev/sdx is your microSD card. Make sure that you flash in SD card.

After that plug microSD card to GW-08 and power up the device.

Remote access via SSH.

Look for orangepizero device on your DHCP server:

192.168.100.1/index.asp

HUAWEI

HG8245

Logout

Status

WAN

LAN

WLAN

Security

Forward Rules

Network Application

System Tools

WAN Information

VoIP Information

WLAN Information

Eth Port Information

DHCP Information

Optical Information

Battery Information

Device Information

User Device Information

Service Provisioning Status

Status > DHCP Information

On this page, you can query the basic DHCP information, including the host name, IP address, MAC address, remaining lease time, and device type.

Total IP Addresses Number:	253
ETH IP Addresses Number:	9
WiFi IP Addresses Number:	4
Remaining IP Addresses Number:	240

Host Name	IP Address	MAC Address	Remaining Lease Time	Device Type
iPhone-Ajrat	192.168.100.2	9c:fc:01:d1:b6:ed	243729(s)	Computer
almaz	192.168.100.4	2c:d0:5a:50:88:c5	228788(s)	Computer
android-6aef4179dc18c01a	192.168.100.3	74:04:2b:d6:b7:10	256731(s)	Computer
pc	192.168.100.5	40:8d:5c:ee:ec:96	208600(s)	Computer
<u>orangezero</u>	<u>192.168.100.7</u>	02:42:b0:4d:9f:a8	259081(s)	Computer

Now connect to it via SSH:

```
ssh root@192.168.100.7
```

User/pass to login: root/1234.

You will be asked to change password and add new user.

After that we ready to configure spi interface and install required lorawan packets.

Enabling SPI on armbian on first booting

Check that spidev not exist in list of devices:

```
ls /dev/spidev*
```

Add params to config file to enable SPI interface:

```
nano /boot/armbianEnv.txt
```

Change overlays param to:

```
overlays=usbhost2 usbhost3 spi-spidev spi-add-cs1
```

Add following at the end of file:

```
param_spidev_spi_bus=1  
param_spidev_spi_cs=1
```

Exit with file saving.

Configure dts tree:

```
cp /boot/dtb/overlay/sun8i-h3-spi-spidev.dtb ~  
cd ~  
dtc -I dtb -O dts -o sun8i-h3-spi-spidev.dts ./sun8i-h3-spi-spidev.dtb  
nano sun8i-h3-spi-spidev.dts
```

Set following in fragment@2:

```
status = «ok»;  
reg = <0x1>;
```

Exit with file saving.

Then compile new dtbo file and replace old one with that:

```
rm sun8i-h3-spi-spidev.dtbo  
dtc -I dts -O dtb -o sun8i-h3-spi-spidev.dtbo ./sun8i-h3-spi-spidev.dts  
sudo rm /boot/dtb/overlay/sun8i-h3-spi-spidev.dtbo  
sudo cp sun8i-h3-spi-spidev.dtbo /boot/dtb/overlay/
```

After that reboot:

```
reboot
```

After reboot connect to the gateway via ssh as user you created previously.

```
ssh al@192.168.100.7
```

Now you should see spidev1.1 in list of your devices:

```
ls /dev/spidev*
```

SX1308 reset script.

Create SX1308 reset script:

```
cd ~  
touch iC880-SPI_reset.sh  
nano iC880-SPI_reset.sh
```

Enter following to that file and save it:

```
#!/bin/bash  
echo "11" > /sys/class/gpio/export  
sleep 2  
echo "out" > /sys/class/gpio/gpio11/direction  
echo "0" > /sys/class/gpio/gpio11/value  
sleep 1  
echo "1" > /sys/class/gpio/gpio11/value  
sleep 1  
echo "0" > /sys/class/gpio/gpio11/value  
sleep 1  
echo "1" > /sys/class/gpio/export  
sleep 2  
echo "out" > /sys/class/gpio/gpio1/direction  
echo "1" > /sys/class/gpio/gpio1/value  
sleep 5  
echo "0" > /sys/class/gpio/gpio1/value  
sleep 1  
echo "0" > /sys/class/gpio/gpio1/value
```

Then set is as executable:

```
sudo chmod +x iC880-SPI_reset.sh
```

Installing lora_gateway.

Download and modify the library:

```
cd ~
git clone https://github.com/Lora-net/lora_gateway.git
cd lora_gateway
nano libloragw/src/loragw_spi.native.c
```

Change /dev/spidev0.0 to /dev/spidev1.1 and save file.

Compile the library:

```
make
```

Installing packet_forwarder.

Download and compile the library:

```
cd ~
git clone https://github.com/Lora-net/packet_forwarder.git
cd packet_forwarder/
./compile.sh
```

Set lora server IP address:

```
cd lora_pkt_fwd/cfg/
cp global_conf.json.PCB_E286.EU868.basic ../global_conf.json
nano global_conf.json
```

Set «server_port_up» and «server_port_down» to port your lora server uses. Set «server_address» to IP address of lora server you use. For example:

```
"gateway_conf": {
  "gateway_ID": "AA555A0000000000",
  /* change with default server address/ports, or overwrite in local_conf$
  "server_address": "192.168.100.5",
  "serv_port_up": 1700,
  "serv_port_down": 1700,
  /* adjust the following parameters for your network */
  "keepalive_interval": 10,
  "stat_interval": 30,
  "push_timeout_ms": 100,
  /* forward only valid packets */
  "forward_crc_valid": true,
  "forward_crc_error": false,
  "forward_crc_disabled": false
}
```

Now all ready to run the gateway.

Running the gateway.

Run this at every power up of gateway:

```
cd ~
sudo ./iC880-SPI_reset.sh
sudo chmod 777 /dev/spidev1.1
cd packet_forwarder/lora_pkt_fwd
./lora_pkt_fwd
```