

## KC908 Manual on Connecting Open-source Radio Platform GNURadio

# 1. Overview

KC908 is capable of communicating with PC by utilizing the USB3.0 (Type-C) port on its left side. This port comes with high-speed IQ signal as well as attenuation and gain control. Obviously, any signal processing software and developing platform based on PC is feasible to connect to KC908 as well as to transceive data.

GNU Radio refers to a specific open-source radio developing platform. GNU, instead of being the abbreviation of several significant words, represents GNU's Not Unix, which is a general public license with sarcasm to the copyright issue of Unix. GNU Radio is a program based on GNU-GPL license.

This manual will walk you through the process of connecting KC908 with GNU Radio.

ATTENTION:

1. The amplitude of those IQ data transmitting through USB hasn't been calibrated, hence the signal amplitude data in GNU Radio is just for information only, not matter it's from transmitting or from receiving.
2. To connect with GNU Radio, the firmware of KC908 should be of version V1.4.0 or above.

[Upgrade Manual]:

3. This manual presumes the user has already installed GNU Radio and is familiar with the basic operations.
4. For the time being, only Linux system is supported on this port.
5. Duplex not supported currently.

Below shows the details of the connecting process.

# 2. Configuring Running Environment

Download this software package before installing.

<input type="checkbox"/> 名称	修改日期
 lib	2020/9/2 11:39
 module3.7	2020/9/8 11:54
 module3.8	2020/9/8 17:46

This pic below shows what's inside the folder after decompressing.

## 2.1 Install Port Library

The path of the script for installing port library is “lib/install.sh”.

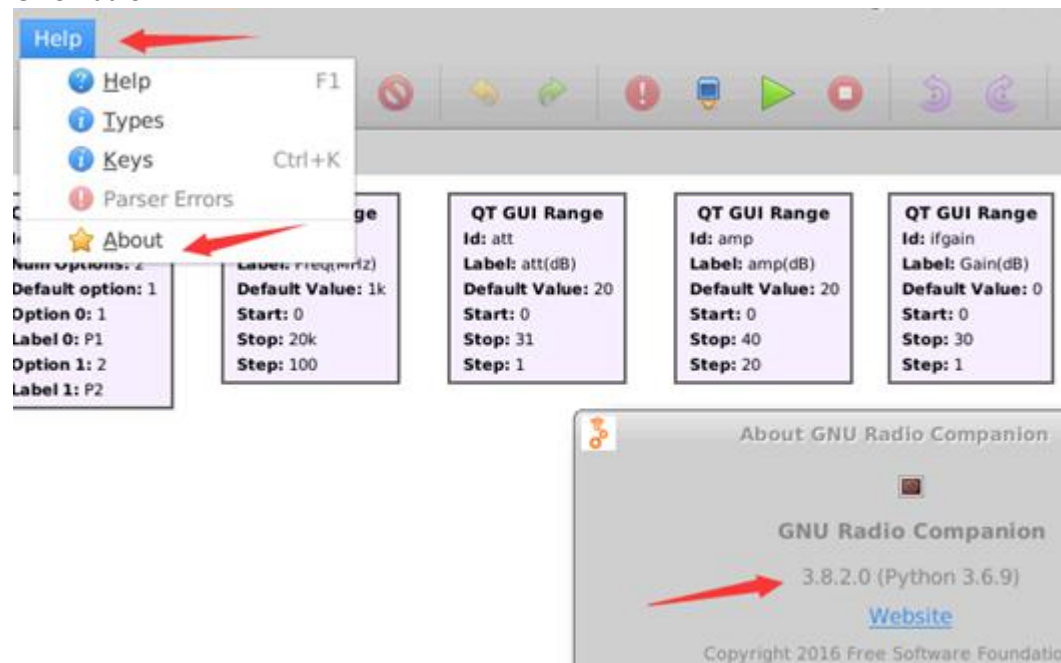
Simply run the script in Shell and the port library will be installed automatically: `sh install.sh`

## 2.2 Install GNU Radio Module

Due to the fact that the constructing method of the module differs in GNU Radio version 3.8 and versions newer than 3.8, we provide two versions of modules. “Module3.7” represents the module for version older than 3.8 while “module3.8” represents the module for 3.8 and versions new than that.

### 2.2.1 Obtaining the Version of GNU Radio

After running “gnuradio-companion”, navigate to ‘Help - About’ to find the version of GNU Radio.



### 2.2.2 Install Module

The path of the module script: “modulex.x/install.sh”

Simply run “install.sh” in the folder “modulex.x” corresponding to your GNU Radio version (see 2.2) to install the module: `sh install.sh`

In the module list the corresponding transmitting and receiving modules of KC908 can be seen.



## 3. Using KC908's modules

### 3.1 Connecting KC908

Navigate to FUNC menu on KC908 and enable Remote Mode.



Connect KC908 with PC using an USB3.0 Type-C cable. Note that this cable needs to be truly USB3.0, not those phone charging cables that connect power source only or those USB2.0 cables claiming itself to be USB3.0

After connecting, type in command “lsusb” in Linux, and the device would be found.

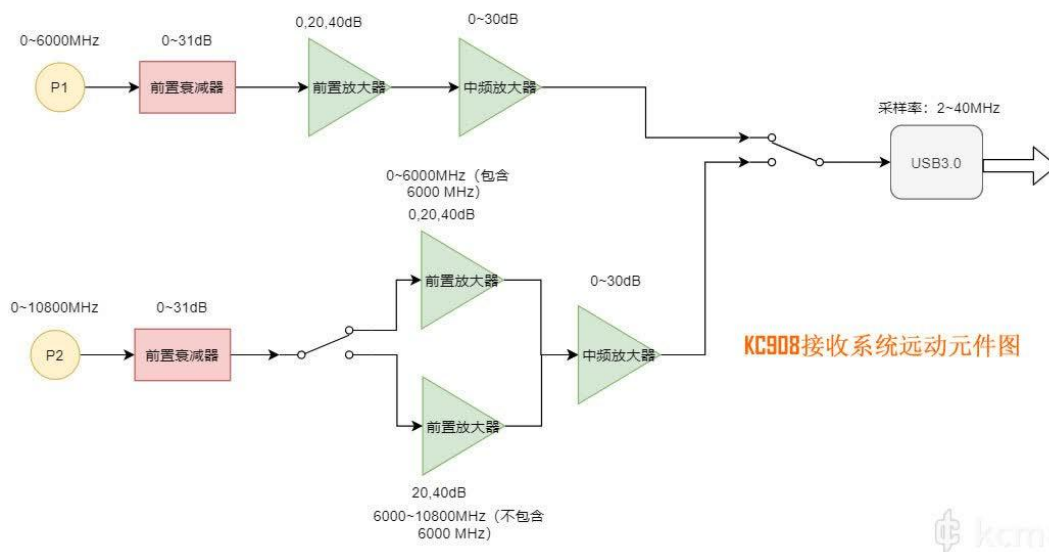
```
cec@lab:~$ lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 004: ID 0403:601f Future Technology Devices International, Ltd
Bus 001 Device 003: ID 05e3:0608 Genesys Logic, Inc. Hub
Bus 001 Device 002: ID 8087:07dc Intel Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

Note that since the port IC is manufactured by FT company, the name of the device would be 601f instead of KC908.

## 3.2 Using the Receiver

### 3.2.1 The Logical Schematic Diagram of the Receiver

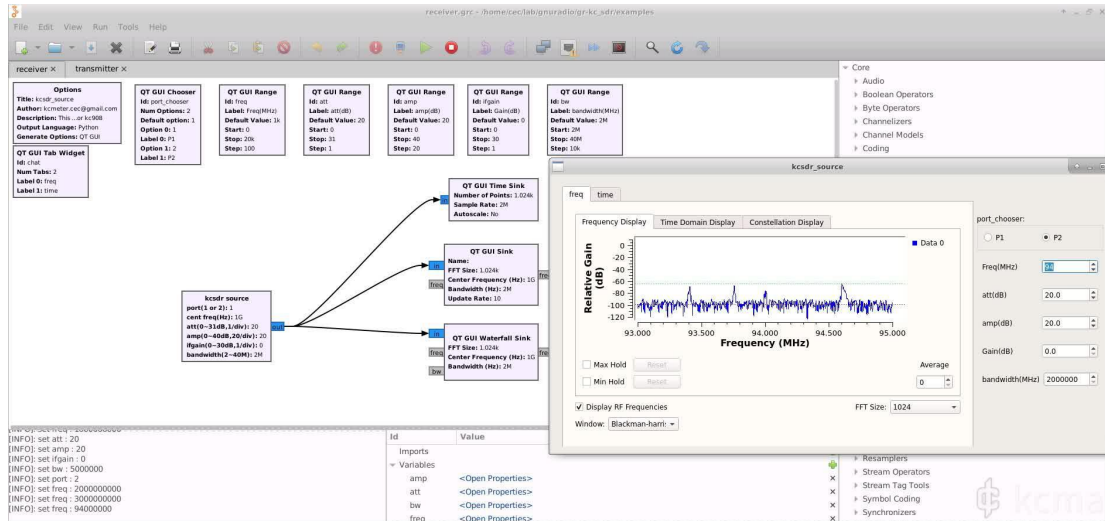
The pic below shows the logical schematic diagram of the receiver of KC908, and the components on the diagram are controllable. In addition, the receiving frequency also needs to be set.



If the value specified by the user is beyond the allowed range, KC908 would limit it within the edge of the range. Take pre-attenuator as an instance, the limit is 31dB and the user set it to be 40dB, KC908 would set it to 31dB in the end. The user is spared from the concern of setting preselector or local oscillating frequency since KC908 would set these parameters automatically according to the receiving frequency.

### 3.2.2 Running an Instance

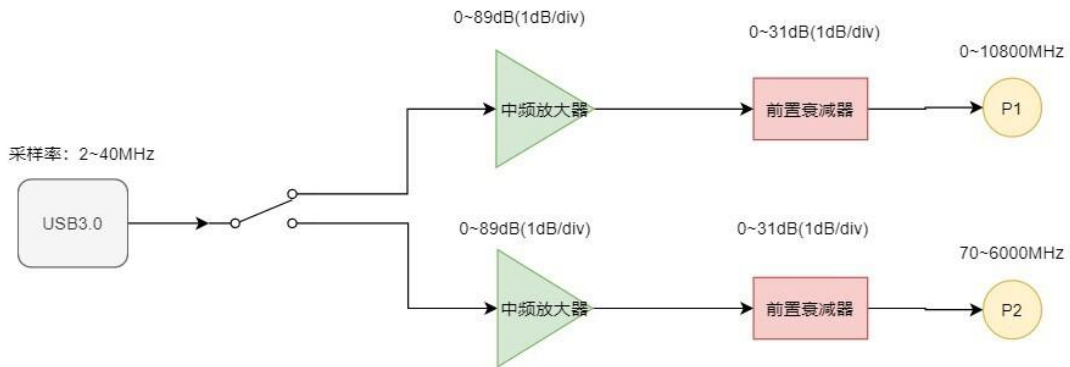
An instance is included in the software package provided in chapter 2. Open the folder and run “module.x/examples/receiver.grc” to obtain frequency spectrum from KC908.



### 3.3 Using the Transmitter

#### 3.3.1 The Logical Schematic Diagram of the Transmitter

The pic below shows the logical schematic diagram of the transmitter of KC908, and the components on the diagram are controllable. In addition, the transmitting frequency also needs to be set.



If the value specified by the user is beyond the allowed range, KC908 would limit it within the edge of the range. Take attenuator as an instance, the limit is 31dB and the user set it to be 40dB, KC908 would set it to 31dB in the end. The user is spared from the concern of setting local oscillating frequency since KC908 would set the parameter automatically according to the transmitting frequency.

#### 3.3.2 Running an Instance

Open the folder and launch "module.x/examples/transmitter.grc" to transmit FM modulation from KC908.

