

# USB Digimode-3 Interface Guide

First of all, thank you for purchasing my USB Sound Card Digimode interface. Hopefully, this guide will allow you to get your PC connected to your transceiver with the minimum of effort. Your Interface comes with a 30 Day No Questions Satisfaction Guarantee and full 12 Month warrantee against material failure.

**Please note:** Although I have never had any interface damage a Radio or associated Computer, you use this item entirely at your own risk. I will not be responsible for any damage caused to your equipment through use of this product. You should always follow the manufacturer's instructions when connecting items to your equipment.

To use this interface you will need a PC with an available USB port and suitable Digimode software such as Fldigi or DM780 (which comes with the Ham Radio Deluxe distribution). Your transceiver requires an accessory/data/packet port that presents Tx/Rx audio and PTT.

## Interface description and connection

The interface allows you to use Digital Mode software giving you access to any AFSK mode such as PSK31, WSJT, FT8, RTTY, SSTV etc.

The interface has a built-in USB Sound Card which uses the CMedia CM108 chipset. Most operating systems have the driver for the CM108 pre-installed.

Having this separate sound card interface dedicated to your transceiver frees up your existing system audio and level controls for your day-to-day PC activities. Therefore you can set the optimum levels up for the USB Soundcard Digimode interface without it affecting your normal PC sounds.

The CM108 chipset connects to the transceiver data port Tx and Rx audio pins via high quality 600:600 Ohm isolation transformers. PTT keying is via a built in VOX circuit which keys the transmitter via an opto-isolator. This gives you full galvanic isolation of the Tx/Rx audio and PTT activation limiting the risk of ground loops, pick-up and static discharge issues.

The interface box is very compact measuring just 80x40x20mm and is simple to set up. The USB cable from your PC enters into one side of the interface box and on the output of the box is a cable with the appropriate plug to fit to the Data/packet socket on your transceiver. The connections are clearly marked with the label on the lid of the box.

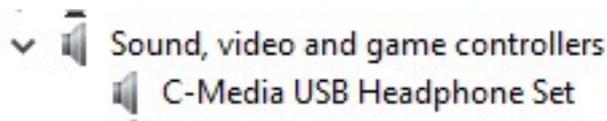
# Connecting to your PC and Transceiver

This could not be simpler. It is just two connections.

- **PC USB.** This cable connects to a free USB port on your PC.
- **Radio Audio/PTT.** This cable connects to the accessory/data/packet jack on your transceiver. When you purchased the interface, you will have specified your transceiver type and so this connector will be appropriate to your set-up. For instance Icom transceivers use the 8 or 13 Pin accessory jack, Yeasu use the 6 pin Mini Din or 5 Pin Din Data/Packet jack and Kenwood use the 13 pin accessory jack.

## USB Set-up.

The interface is based around the excellent CMedia CM108 USB Soundcard chipset. Most operating systems will already have the driver pre-installed for the CM108. When you plug it into your PC on a Windows PC and inspect the “Device Manager – Sound, Video and game controllers” section, you should see the interface installed as a “C-Media USB Headphone Set”, “USB Audio device” or similar as shown below.

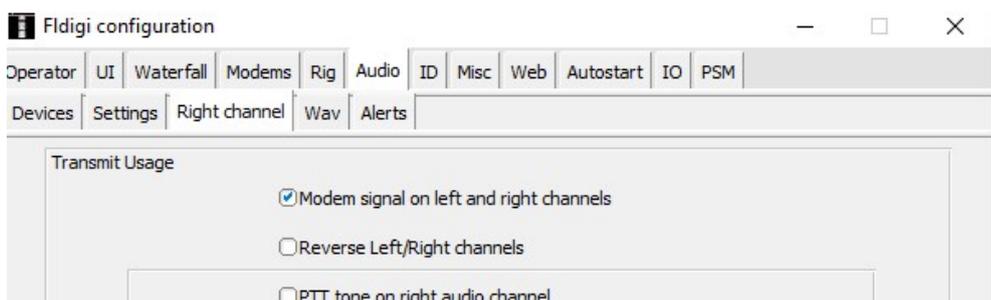


If your operating system does not detect the CM108, the drivers can be downloaded and manually installed from the CMedia Website. Download the CM108B driver from here. [https://www.cmedia.com.tw/support/download\\_center](https://www.cmedia.com.tw/support/download_center). If you are running an Apple PC, the CM108 driver is also pre-installed in the operating system.

## PTT Set Up

The interface uses the Right channel for the transmit audio and the Left channel is used to drive the internal VOX circuit.

It is important that you set your preferred Digital Mode software to output audio on **both** the Right and Left channels. For instance Fldigi has an option in the Soundcard settings to do this (see image below). Check your preferred software to make sure both Right and Left channels are enabled in transmit.

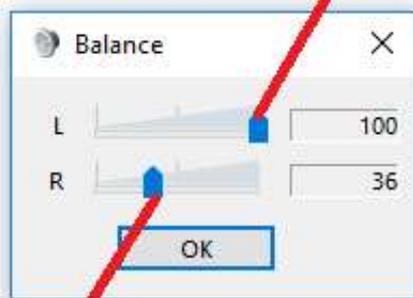


Normally you can optimize your audio levels with the combined output level slider for the CM108 and you will not need to alter the level for the VOX.

However, if you find that you need very little audio level on the Right hand channel to drive your transmitter to the desired power, this may not be enough level to trigger the VOX circuit on the Left channel. Under these circumstances, you can alter the channel balance in Windows to allow for more level on the left channel to drive the VOX PTT.

If, when you drop back to receive the PTT stays keyed for slightly too long, just back off the left channel level so that the PTT is just activating when in transmit. This will reduce the “hang” time but be aware some digital mode software may have a Tx hang timer setting which you could try to shorten.

Optimise the VOX PTT on the Left channel



Optimise your transmit audio on the Right channel

## Audio Set Up

Most Digimode software comes with set-up instructions for transmit and receive audio levels and so you will need to refer to the instructions that came with your software of choice. However, I will offer some pointers.

### Receive Audio Level

Most manufacturers have chosen to standardize the Audio levels (AF detector output) from the accessory sockets on their radios and this will be unaffected by the volume control the radio. The level is more than adequate to drive the input of the USB Sound Card Interface.

At this point I am assuming you use Microsoft Windows. To enable the input feature of your sound card, run up the “Sound” application from “Control Panel” and ensure that the Line or Microphone inputs are enabled and the audio levels set accordingly. There are so many variations of audio drivers and applications, it would be impossible to cover all aspects in this set-up document. However, many PC audio applications have an input level meter and you need to adjust the Line in or Microphone input level such that your decoding application has enough received audio level to operate without clipping the audio input.

## **Transmit Audio Level**

The USB Sound Card Interface has plenty of output level to adequately modulate modern transceivers.

Now let us consider the PSK31 mode. It is effectively a 2-tone signal which in theory occupies 31.25kHz worth of bandwidth. However, because it is a 2 tone signal you need your transmitter output stage to be operating in a linear mode to limit the possibility of inter-modulation distortion.

I have done a fair bit of experimentation and research into the optimum drive level and came across a truly excellent article by N1NKM. Have a look at the following web-link and it explains very well the pitfalls of getting the modulation and power levels wrong. (<http://www.mymorninglight.org/ham/psk.htm>)

If you follow this procedure from N1NKM, you should produce a nice clean signal.

1. Set the output power of your transceiver to 50% of nominal.
2. Set the Line output level of your sound card to zero.
3. Put your preferred PSK or Digi-Mode application to transmit mode.
4. Raise the line output audio level of your sound card so that you start to produce output power and your transmitter ALC meter is "just" moving off the bottom of the scale. At this point, make a note the transmitter output power.
5. Now turn down the line output level from your sound card to reduce the transmitter output power by 20%

This will ensure that your transmitter is not crushing the signal and that the ALC is not having any effect.

You need to bear in mind that PSK is a very narrow band mode and by using the DSP functionality of a modern PC and soundcard, it is the equivalent of having a VERY narrow filter in your receiver. This means that even the lowest output powers can result in very useable PSK communication.

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