

## RSP2 Reference Clock Application Note



The RSP2 is a powerful wideband full-featured SDR which covers all frequencies from 1 kHz up to 2 GHz. This enhanced version of the popular RSP1 provides a high stability TCXO and additionally features input and output reference clock functionality which enables the user to daisy chain multiple devices together, or provide an external reference. This application notes covers the use of the external clocking features of the RSP2.

## Introduction

The RSP2 contains both an input and an output for the reference clock. This gives users of the RSP2 the ability to either use an external reference clock source for one or more RSP2s or to synchronise the clocks of multiple RSP2s using one device as the master reference. Connection to the reference clock input or output is made on the rear of the RSP2 using the “IN”, “OUT” connectors. The “IN” connector provides a point at which to connect the external reference clock and the “OUT” providing the reference clock output signal.



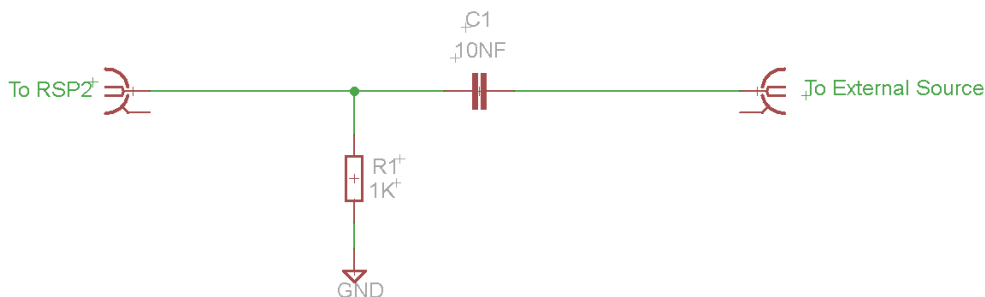
The connection itself is made using an MCX interface and so a suitable cable will be required. The picture below shows an MCX to MCX cable suitable for connecting multiple devices in a master-slave arrangement.



If using an external reference source as the clock for the RSP2, it must adhere to the following specification:

- Amplitude: 1-2 volts (peak-peak) @ 0V DC bias (please note, a floating output is not acceptable, there must be a resistive path to ground to give a 0V bias)
- Frequency: 24 MHz

It is essential that the signal has a 0v DC bias. If you are unsure of the DC bias on the output of your reference clock source or whether it might be AC coupled, we recommend adding the following circuit in series between its output and the clock input of the RSP2.



**Application 1: Using an external reference clock with your RSP2**

To use an external reference clock, it is necessary to set things up in a specific sequence. This sequence **must** be followed for the system to work:

1. The RSP2 must first be unplugged from the USB port of your PC or other computing device
2. Start your external reference clock and connect it to your RSP2
3. Plug in your RSP2 and start your application software

**Application 2: Using Multiple RSP2s with an external master reference clock**

In this application an external reference clock is used as a 'master' for two or more RSP2

1. All the RSP2s must first be unplugged from the USB ports of your PC or other computing device
2. Start your external reference clock and connect it to your first RSP2
3. Plug in the USB cable of your first RSP2 to connect it to your PC and start your application software
4. Initialise your first RSP2 with your application software (press 'Play' in SDRuno, or 'Start' in HDSDR' or SDR console)
5. Enable REFCLK out on your first RSP2
6. Connect the CLK O/P from your first RSP2 to the CLK I/P of your second RSP2 using a MCX male-male cable
7. Plug in the USB cable of your second RSP2 to connect it to your PC and start your application software
8. Initialise your second RSP2 with your application software (press 'Play' in SDRuno, 'Start' in HDSDR' or SDR console)
9. If you want more than two RSP2 devices in your clock 'daisy chain', then now enable REFCLK out on your second RSP2 and connect it to your third RSP2 using a MCX male-male cable
10. For more devices repeat steps 5-7 for subsequent devices

**Application 3: Synchronising multiple devices in a master-slave arrangement**

In this application, one RSP2 acts as a clock 'master' for one or more other 'slave' RSP2s

1. All the RSP2s must first be unplugged from the USB ports of your PC or other computing device
2. Plug in the USB cable of your first RSP2 to connect it to your PC and start your application software
3. Initialise your first RSP2 with your application software (press 'Play' in SDRuno, 'Start' in HDSDR' or SDR console)
4. Enable REFCLK out on your first RSP2
5. Connect the CLK O/P from your first RSP2 to the CLK I/P of your second RSP2 using a MCX male-male cable
6. Plug in the USB cable of your second RSP2 to connect it to your PC and start your application software
7. Initialise your second RSP2 with your application software (press 'Play' in SDRuno, 'Start' in HDSDR' or SDR console)
8. If you want more than two RSP2 devices in your clock 'daisy chain', then now enable REFCLK out on your second RSP2 and connect it to your third RSP2 using a MCX male-male cable
9. For more devices repeat steps 5-7 for subsequent devices