Versions Covered
SDRUno V1.22 for RSP1, RSP1A, RSP2 & RSP2pro
SDRUno EXTIO Radios V1.06
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Introduction
Welcome to the SDRuno Cookbook,

I’m Paul Jones, Amateur Radio Operator NN4F and general SDR Junkie, I’m a Beta tester for all the SDRPlay products, and a member of Simon Browns SDR-Console Test Team.

Mike Ladd is a SDR Techno Junkie and Licensed Amateur Operator, callsign KD2KOG, and has been a SDRPlay Beta tester, as well as a tester/reviewer for many SDR’s, Since the last version of the cookbook, Mike now works for SDRPlay, and he still has input into this cookbook.

In this document we’ll try and cover all the facets of the SDRUno software, and its various settings using screen shots were applicable. The aim is to make the use as simple as possible, allowing you to get the maximum from the software, used in conjunction with the Uno Manual.

I’d like to thank the SDRPlay team for all the great work they do, and for allowing me to take part in the testing, along with Mike Ladd, Preben Lohse Rasmussen and Kyle McKenzie.

And also, to thank Mike Ladd again KD2KOG for his input and help with this guide.

Use this guide along with the manual supplied in the install, this is just a guide to try and make a few things easier to understand, we hope it helps you.

I’m also not going to cover the install, as this is very simple, download the software from SDRPlay.com and click on run and the software will install itself and the API driver, and we will start once you double click on the SDRuno icon.

This guide will cover the basics of SDRUno and is FREE. We will be producing the “CookBook Plus” which will be available via Amazon in the very near future, this will cover what’s in this guide and also how to set up the various programs that can be used with SDRUno, such as CSVUserlist, Multipsk, WxtoImg, WSJTX, FLDigi, and many more.

First, we’ll go over the windows and explain what they all do, or you can skip to page 23, to the step-by-step setup.
Changelog for 1.22 RSP1,RSP1A,RSP2,RSP2pro & EXTIO 1.06 Updates

Added
• Support for 1366x768 default layout
• ADC overload detection in AGC off mode
• ADC overload acknowledgment system to avoid lockout condition
• Custom step size for each mode
• Band Button Groups (Ham Lower, Ham Upper, Broadcast)
• Two additional SP1 width presets (2560 and 3840)
• Additional menu option in memory panel to reset column widths (helps when upgrading)
• Scheduled Recording
• Auto update

Changed
• Registry reset now only clears 1.2+ entries
• SP1 Window max size supports 4K displays (3840x2160)
• Small improvements to the memory panel (panel width and field width changes)
• Improvements to the IF output mode
• UTC time fixed to 24 hour format
• Play!/Stop button color coordinated
• Move MUTE button to make way for VOLUME label
• Moved Squelch value display to the right

Fixed
• Log10 SING error
• Aero support detection to try to prevent rendering issues
• Freezing when switching to HiZ port in gain mode
• Gain "pumping" issue when in gain mode
• Settings panels not displaying properly when "un-minimized"
• Zoomed in frequency scale drag out of bounds bug
• Noise floor measurement bug
• Improved RSP error handling
• Sample rate change causing spectrum display issues
• Device selection bug

Known Issues
• SP2 CWAFC drift issue (Zoom/window size/freq display) – will be addressed in 1.23, workaround for now is to zoom out fully in the SP2 window and then the CWAFC feature will work.
• IF output mode disabled SP1 spectrum mouse clicks – temporary issue until LO is separated from the VFO (see plans below)
The Main Tab RSP1/1A

The **MAIN** tab is the first box you will see when you click on the SDRuno icon. This is the basic control panel for the radio. Some options vary by the version of the RSP you have plugged in.
So, when you first start, this is what you will see.

You have access here to the main controls, LNA, AGC, etc. so we’ll step through what they all do and how to get the best from them.

This is also the screen for profiles and additional VRX or Virtual Receivers. And then the status of SDRUno processor usage and system usage.

**SETT** – Opens the settings window

**MA** – Maximize/Minimize all, this keeps all the windows in sync when minimizing the windows

**OPT** – Menu, Options for the input, I/Q swap, Help File and more.

**SR** – Sample Rate for Sound Card Input when not using RSP or ExtIO radio

**REC PANEL** - This brings up the record panel to allow for I/Q recordings

**FINAL SR:** - The Sampled rate selected bandwidth.

**SP1** – Main Spectrum Panel

**SP2** – Auxiliary Spectrum Panel, the Audio Spectrum

**RX** – The Receiver Panel

**ADD VRX** – This allows you to add an additional VRX, this can only be added if the radio is stopped. The additional VRX has to be in the selected bandwidth you have selected.

**DEL VRX** – Delete the last VRX on the list. (stopped radio only)

**LO LOCK** – Locks the LO frequency when tuning

**LNA** – The RSP LNA On or Off (RSP1 Only)

**AGC** – Turns the RSP AGC On or Off

**GR** – Shows the Gain Reduction or Gain

**SR (MHz)** – You can click here to fast change the RSP bandwidth on the fly

**DEC** – Decimation, only values allowed can be selected

**PLAY** – Starts the radio

**MEM PAN** - Opens up the Memory Panel

**IF GAIN Reduction** - this slider can be moved if AGC is turned OFF

**IFBW** - shows the bandwidth and either LIF (LowIF) or ZIF (ZeroIF)

**BIAS-T** - Turns the Bias-T ON or OFF (Highlighted is ON)

**MW-FM NOTCH** – Applies the built-in MW/FM notch filter this applies to RSP1A/2/Pro (not visible on HiZ)

**DAB NOTCH** – Applies the built-in DAB filter (RSP1A Only)
The Main Tab RSP2 & RSP2pro

The **MAIN** tab is the first box you will see when you click on the SDRuno icon. This is the basic control panel for the radio. There are a few changes when using the RSP2/RSP2pro

So when you first start, this is what you will see.

You have access here to the main controls, LNA, AGC, etc. so we’ll step through what they all do and how to get the best from them.

This is also the screen for profiles and additional VRX or Virtual Receivers. And then the status of SDRUno processor usage and system usage.

**SETT** – Opens the settings window

**MA** – Maximize/Minimize all, this keeps all the windows in sync when minimizing the windows

**OPT** – Options for the input, I/Q swap

**SR** – Sample Rate for Sound Card Input when not using RSP or ExtIO radio

**REC PANEL** - This brings up the record panel to allow for I/Q recordings

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**SP1** – Main Spectrum Panel

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**ADD VRX** – This allows you to add an additional VRX, this can only be added if the radio is stopped. The additional VRX has to be in the selected bandwidth you have selected.

**DEL VRX** – Delete the last VRX on the list. (stopped radio only)

**LO LOCK** – Locks the LO frequency when tuning

**GR** – Shows the Gain Reduction or Gain

**SR (MHz)** – You can click here to fast change the RSP bandwidth on the fly

**DEC** – Decimation, only values allowed can be selected

**PLAY** – Starts the radio

**MEM PAN** - Opens up the Memory Panel

**RF GAIN Reduction** - this slider can be moved if IF AGC is turned OFF

**IFBW** - shows the bandwidth and either LIF (LowIF) or ZIF (ZeroIF)

**BIAS-T** - Turns the Bias-T ON or OFF (Highlighted is ON)

**ANT A** - Selects Antenna Port A

**ANT B** - Selects Antenna Port B with the Bias-T

**HI Z** - Selects the HiZ antenna port

**MW-FM NOTCH** – Applies the built-in MW/FM notch filter this applies to PORT A/B ONLY (not visible on HiZ)
The rest are self-explanatory, Date and Time and System Loads

The bottom **RSP1** is text I typed in, this is where the profile is stored, it starts as Default Workspace, when you hit CRTL+W a pop up menu will appear, change this to Workspace 1, then right click and you can rename this to your selected profile name, I have profiles for different screen settings, when running on a laptop or additional monitor.

There is also an ADC Overload display that pops up in YELLOW next to ANT A if you are overloading the ADC, so back off the gain if this appears, and this only works if the AGC is on automatic.

**It is recommended to use the IF AGC for most of your listening, and to keep the slider at the BOTTOM of the scale, the IF AGC circuit works well and you should not need to move it.**

The following screens are available when you click on the **SETT** button at the top of the main window

**Main SETT Input.**
Shows RSP1/1A/2 ready, main uses here are the input level display, normally the RSP has always shown gain as Gain Reduction, it can also now be shown as gain.

**IF Mode**, this is where you select either ZeroIF or LowIF mode. And IF AGC, allows you to turn off the IF AGC.
Main Sett Cal.

**External gain**, you can add gain if using a external LNA or coax loss, **this affects the S-Meter & dBm display**.

**Crystal Cal** is the PPM setting, set via tuning to WWV and running SAM with DSB and then go to the RX SETT window and hit the CAL button for automatic PPM Calibration or you can use a signal generator or known calibrated signal source.

**Tuner IF AGC Setpoint**, this is the amount of gain reduction when using the AGC ON normally -25 to -30 works well.

**Lo Plan**, allows you to change from AUTO / 120 / 144 / 168, this sets the LO IF plan and removes the gap when on Auto.

**Reference Clock Output (RSP2 Only)**—This enables the clock out for synching multiple RSP2’s, start 1 rsp, check this box the insert 2\textsuperscript{nd} RSP2.

Main Sett Offset.

This is used when using an up converter, main if using an extio radio, or if using the SDRPlay as an IF for a satellite downconverter or such.
Main Sett Orig (OmniRig)

Gives info on radios that are setup via omnirig RIG 1 and RIG2

SET IF OUTPUT FREQUENCY, if connecting to your Radios IF output, to use the RSP as a panadapter, enter the IF frequency here in Hz and press enable. Example shows a 60Mhz IF

Main Sett Misc.

Let’s you set the s-meter to the IARU standard.

Reverse mouse button.

Shows time in UTC. To show time in 24hr format, your PC System time must be set to 24hr also.
The SP1 Window

This is the main spectrum window

SETT will allow you to bring up the settings for waterfall gain, contrast, speed and additional settings. SP is spectrum only, WF is Waterfall only, SP+WF is shown above and COMBO is an overlay mix, which is a very nice display. Zoom is zoom, VFO centers the display on the current signal in the window (only works if zoomed in) RBW is the Resolution Bandwidth, this affects the display only not the signal quality, you can lower the RBW, the display will be a lower resolution, this will help if you have a slower system, as less CPU is needed for the FFT display. I is the info just above the center scale. You can slide up and down by left clicking on the scale, if you want to move by a larger amount, you can SHFT+Left click on the scale and GREEN bar will appear, then scroll is much faster. Also in the display below the S-Meter are the dBm display, this is duplicated in the RX frequency window then also the SNR display of your current signal.

From SDRPlay: Please note the change in the way the signal is scaled on the SP1 and SP2. The signal is now in dBm referred to the antenna port as opposed to dBfs at the ADC input. This is a major change in the way the signal is represented, but I think it is more intuitive and useful. SP1 is now like a spectrum analyzer. Just remember that the noise floor (in the Y-scale) is the noise power in the resolution bandwidth of the FFT. As you zoom in, the resolution bandwidth goes down and so you will see the noise floor drop. This is exactly what a
spectrum analyzer does. However, the SNR measurement will not change because both the signal and noise are measured over the digital filter bandwidth shown in the SP2 window.

Important: if you are in ZEROIF mode and you are tuned to the LO frequency, you might hear some distortion on your signals, so just click to the left or right on sp1 and you will see the LO no longer matches the VFO, and any distortion from the DC compensation will be gone.

This is the SETT window for the SP1, has you can see it has various settings, for the FFT, Palette FFT AVG, Marks is the Time Marks, Range and Base allow you to alter the top and bottom ranges, Refresh rate is the speed of the waterfall.

Each SP1 window you open on additional VRX’s has its own settings window.
The SP2 Window

This is the auxiliary window for the Audio Spectrum.

This is very similar to the SP1 window, but for your Audio selection, you can zoom in and out on the audio. Clicking on the spectrum or waterfall has no effect unless you are in CW mode, where you can move signals.

The SETT is the same, it will bring up the settings window for the SP2, F will show just the filtered audio, and FMAF is used on FM signals. Bottom controls are the same as SP1, minus the COMBO screen.

This is the SP2 Settings Screen, again like the main SP1 Settings, minus the option for the combo transparency.

Same controls, FFT, Palette, Contrast, Gain, Range & Base, Refresh Rate, SP Fill, the time marks can also be turned on and off for the SP2 screen, Marks Int is the time interval in seconds, then check the T Marks box for the time lines to appear.
The Receiver Panel (RX)

This is the RX Panel, each VRX will have its own RX Panel. Also LOTS of Clicky bits....

![RX Panel Image]

It may look complicated, but it is rather simple, Standard Controls for VFO A/B, Modes, Filters, S-Meter, Band Buttons, AGC, Squelch, Volume, Notch.

So let’s explore deeper, **Tuning**, obviously it shows the main frequency display of the VRX, this can be changed several ways.

**First**, mouse control, move over the digits, and a yellow cursor will appear above each digit, you can then use the mouse wheel to move that digit up and down.

**Second**, Keyboard Entry, click on the space bar, the white line around will change to yellow, then enter your frequency in KHz, so 14200 and enter will put you on 14.2Mhz. Will be programmed once you hit return.

**Third** for Amateur Bands, you can click on the band buttons down the right side.

**Fourth**, to use the 0-9 digits on the band buttons, hit space then the keys will give you 0-9 rather than the bands.

**Modes** are straight forward, AM/SAM/FM/CW/DSB/LSB/USB/DIGITAL, you can change mode by clicking on the button, or see the keyboard shortcuts at the end of this document. (DRM now use DIGITAL 12Khz)

**SAM** has the option to use DSB/LSB/USB to eliminate qrm above or below the carrier. **FM** has several modes, NFM/MFM/WFM/SFM each with its own filter settings/widths

**NB** has two modes, Wide and Narrow

**NCH** you have 4 notches available, NCH1 & 2 can be moved, 3&4 are fixed, to move 1, hold down the shift and left click, to move NCH2 shift and right click all in the SP2 window

The volume is controlled by clicking on the bottom orange slider, and the squelch level is controlled by the top slider, to enable **SQLC** click on the button, and below is the **MUTE** button.
**Receiver Band Selection.** New to 1.22 is the **BANDS** button, click on it and it will show HAM LOWER, HAM UPPER, BROADCAST, selecting any of these will change the button overlays allowing you to select either HAM or Broadcast.

![Receiver Band Selection](image)

**RX SETT Control**

Clicking on SETT on the RX window will pull up a new window for setting RDS to NA/EU, your CAT settings and Omninig Settings.

CAL is a new addition for V1.1 you can tune to a known precision source i.e. WWV/CHU etc. and then tune to SAM Mode DSB and click on Auto Cal and it will set your PPM offset for the radio.

![RX SETT Control](image)
The Extra Control

This is another pop up panel for the Receiver that contains less used controls, accessed by hitting the **EXW** on the title bar of the RX Control.

This panel contains several user controls that you may want to access, but not always have on screen, personally I keep this window open, but depends on your screen area if you have enough room.

The most used on this are the sliders for **AGC**, **NB** and **NR**, the **AGC/NB** are OK left on the default settings, the **NR** (Noise Reduction) I vary depending on the signal being received. The higher the value, the more **NR** is applied to the signal.

**DEEM** is de-emphasis and can be turned on or off and set for 50us or 75us, normally 75us is for the USA and 50us for the rest of the world.

**AFC** is Automatic Frequency Control, can be on or off.

**MONO** turns off Stereo reception when in SFM mode,

**FMS-NR** is the FM Stereo Noise Reduction. (Turned on by clicking the FMS-NR button above it)

**AM SOFT FILTER**, applies filters to AM to give that old AM tube type AM signal.

Notch filters are only available to RSP Users.
Keyboard Shortcuts

These are the keyboard shortcuts...

Key: Function: Scope:
A - a Select AM rx mode VRX
S - s Select SAM rx mode VRX
F - f Select FM rx mode VRX
C - c Select CW rx mode VRX
D - d Select DSB rx mode VRX
L - l Select LSB rx mode VRX
U - u Select USB rx mode VRX
E - e Select User rx mode VRX
N - n Select NFM rx FM sub-mode VRX
M - m Select MFM rx FM sub-mode VRX
W - w Select WFM rx FM sub-mode VRX
O - o Select SWFM rx FM sub-mode VRX
T - t Toggle Rx/Tx mode (4) VRX
SPACE Starts direct frequency input seq. VRX
Enter Closes direct frequency input seq. VRX
ESC Aborts direct frequency input seq. VRX
CTRL+F Show/hide the files pane Memory Panel
CTRL+S Store enabled VRX to memory location (same as STORE button) Memory Panel
Ins Inserts a new row after the current Memory Panel
Del Deletes the current row Memory Panel
F2 Starts editing the current cell Memory Panel
CTRL+S Store specific VRX to memory location VRX
* Starts IQ file recording Instance (1)
H - h Shows the ExtIO panel (if loaded) Instance (1)
B - b Shows the Memory Panel Window Instance

Up/Down Arrows Change frequency by step size VRX

Note 1: Controls not available when the memory panel has focus.
The Memory Panel

You can have unlimited memory banks available for your use.

It is possible to have many memory banks available, firstly lets import the EiBi HF Database, go to [http://www.eibispace.de](http://www.eibispace.de) and click on the CSV download link and save to your documents folder. Then right click on the Mem Panel above and you can go to IMPORT and select import eibi csv, browse to the file location and load the file. It will appear as above. Once that is complete, right click and save bank.

You can right click and new bank it will open up a blank table and you can click on and type in a frequency, mode etc...

Better still, if you are using the radio, refer to the RX image on page 9, at the top you will see a MCTR on the title bar, click that and it will make this RX the active RX for the memory bank.

Now if you are tuning around and find something you wish to keep, then you can just hit store on the Mem Panel window, and it will save the Frequency and Mode, then you can just click double click on the description and enter the new description you want.

Cont...
If you click on MCTR then right click on the MEM Panel when its open you will get the menu, click on Filter b VRX freq. this will show just the stations on the current frequency

Save your database files in your “My Documents” Folder.
RDS Decoding

SDRUno includes a great RDS decoder, it is accessed from the RDSW button on top of the RX panel.

Clicking on the RDSW button will bring up the RDS Decode Window. Each active VRX can have its own RDS decode available.

This is the RDS decode window, it will display the PI Code, but currently does not decode the PI and it will give you the text.

In the USA you can go to http://db.wtfda.org/

Enter the PI code into the PI Code area, Must use CAPS and it will give you the station info.

UK go to http://www.dxradio.co.uk/ukrdscom.php

Other areas, please just google RDS PI Code Decodes in your area.

Callsign from PI code in a future version.

Scanning is a future option that will be worked on.
SDRuno Reset
This is an easy way to reset SDRuno click on the OPT button in the main window and select
RESET TO DEFAULT SETTINGS.
EXTIO Radios

Although SDRUno is designed for use with the SDRPlay RSP, it will work with any radio that uses the extio standard. It uses a separate EXE file in the start menu.

Place a copy of your extio.dll in the My Documents folder.

To make the extio available, you must disconnect your SDRPlay RSP otherwise this will always be the default radio. So disconnect your RSP, and plug in your other radio, like the RTL or ELAD or such.

Restart SDRuno and click on the OPT in the main panel, and then select input, you should see your other radio listed and the extio will be available and you can start using, the bandwidth is limited to 2.5MHz on any radio other than the RSP.

RTL EExtio

There is a known issue with the RTL extio’s at the moment, the drop down menus do not work, but if you click on the sample rate, you can use the up/down keys to change the settings, the AGC slider does work OK.

Elad Extio
Step By Step Start UP

So this is your step by step guide now that you know what all your windows are.

Your RSP must be plugged in before you run SDRuno.

First click on the SDRuno icon, and the Main Panel will come up, it the top left of your screen, followed by the RX/SP1/SP2/MEM & REC Panel, this is a default layout, and the layout varies by the resolution that your monitor is running at.

so we will set some settings and get you on the air. (this is LOW IF Mode)

1. First let’s set a bandwidth, click in the SR window where this image left says **SR 8.912 Mhz**, once you click you can enter a number, so let’s start at 8.912 and enter, the grey bar next to **GR** is the **GAIN**, set this to the bottom of the scale as in the image. So now that we have the settings to run, we can open up some of the important windows, this is if you are using the IF AGC on, (under the SETT button)

2. on the **SP1** box and the main spectrum window you can move this around and resize to your requirements if you don’t like the factory default.

3. The **RX** box, this will open up the RX Window, where we set the frequency and modes and a few more items like filter bandwidth.
4. The **SP2** Box this is the auxiliary spectrum, where you can look close in at the signal you are on and also vary the filter bandwidth by dragging the filter edges.

5. So now we have all the windows open we need for basic operation. So let’s set a frequency for us to start on. First click in the SP1 window just off center, so we can offset the LO from the VFO. I’m going to start us in the Broadcast FM band, on 102.5 FM (Choose a station close to you) Look, on the RX panel and click on the frequency area, or press the space bar, this will then turn to 0 and you can use the keyboard to enter a frequency.

So for 102.5 Mhz, I have to enter that in KHz, so on the keyboard, enter 102500, hit enter, and the display will read 102.500.000 so now our frequency is set.

6. Let’s set the mode, we need FM and SWFM for FM broadcast, so click on FM and below it SWFM.

7. So now we are set and ready to go to receive our local FM Station. Press PLAY on the main panel and the RSP should spring to life. You will see the signal on the SP1 window and also on the sp2 window.

8. We need to save these setting so that when you start up you can come right back to where you left off, we do this with workspaces on the main window, you will see yours’s says Default Workspace, Right click on the words Default workspace and you will notice it changes, you can now enter a name, I called mine SDRPlay Home, once you have entered a name, press ENTER, this will update the name, now we need to save the current workspace, while holding the CTRL + W down, the menu will pop up and select the space you want to save to. This will store the profile and window settings.
RSP2 & RSP2pro Additional Step by Step Start UP

So when using the RSP 2, make sure you have antennas connected to either of the ports. It is recommended that for HF usage, you use the HiZ port to get the best results, Port A/B work above 1.5mhz, they will work below but performance will be degraded.

Select the port you have the antenna connected to, when selected it will be highlighted. After that your step by step is identical to the RSP1 settings above.

**BIAS-T**, if you have a LNA or device that requires power, check the **BIAS-T** box this will provide **4.7V @ 100ma on PORT B**
Glossary
BW – Bandwidth
DEC - Decimation
FREQ - Frequency
FMS-NR – FM Stereo Noise Reduction
LO – Local Oscillator
LIF - Low IF
NB – Noise Blanker
NBW – Wide Noise Blanker
Notch – Notch Filter – NCH1-NCH4  N1-N4 notch frequencies
OPT - Options
PDBPF – Post Discriminator Band Pass Filter (FM Only)
RX – Receiver
SP1 – Spectrum 1 (Main Display)
SP2 - Spectrum 2 (Audio Spectrum)
SR – Sample Rate
VRX - Virtual Receiver
ZIF – Zero IF
This Guide is a work in progress and to be used in conjunction with the official guide, we will be bringing you user tips and things, we have been testing the software for the past 3 weeks, so as we add more this document will be updated. And we will post in the facebook groups when we update the document.

And watch for our CookBook Plus, where we ill show you all the decoder to uno connections and how to get them all running.

Thanks,

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