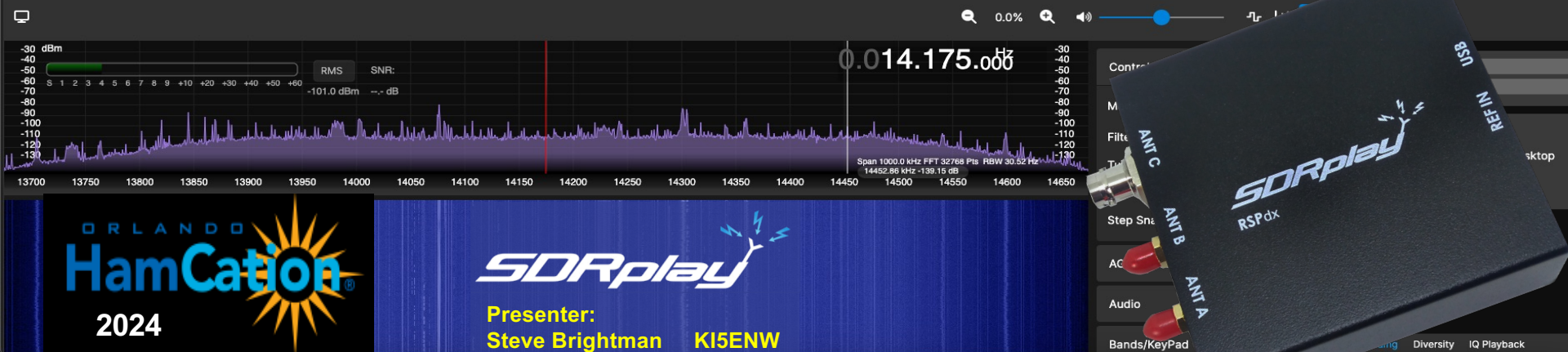


Primary SP



Primary SP - VRX0



SDRplay

Agenda

- The Basics
- Applications
- Hardware
- Software
- Panadapters
- Support & Information Sources
- Q&A



What is an SDR?

- A radio communication system where many components that have been traditionally implemented in **hardware**...

(e.g. mixers, filters, amplifiers, modulators/ demodulators, detectors, etc.)

...are implemented by **software** on a PC or embedded system.

- The hardware portion consists of pre-selection filters, possibly some IF filtering and a Analog-to-Digital Converter
- SDR is a technique, the actual implementation will vary by application:
 - e.g. Receivers tend to concentrate on wide bandwidth, Transceivers on narrower bandwidth at a specific frequency

Why do I want an SDR Receiver?

Top Ten List

1. True general coverage
2. Work one frequency and still monitor the entire band (or another band!)
 - Panadapter (suddenly your eyes can do 1000X what only your ears could do previously, one signal at a time!)
3. Audio and IF Digital Signal Processing (DSP)
4. Filters! (brick-wall envelopes... improving all the time with s/w upgrades)
5. Harness the power of your existing Computer
6. Multiple VFOs and/or virtual receivers
7. Schedule and Record large bandwidths of the spectrum and tune later!
8. Record/playback of audio from a specific signal
9. Allows you to explore new applications:
 - Digital modes, WX satellites, radio astronomy, aircraft monitoring, digital stations, TV, DAB, Ionosondes etc etc
10. Can you ever have too many receivers?

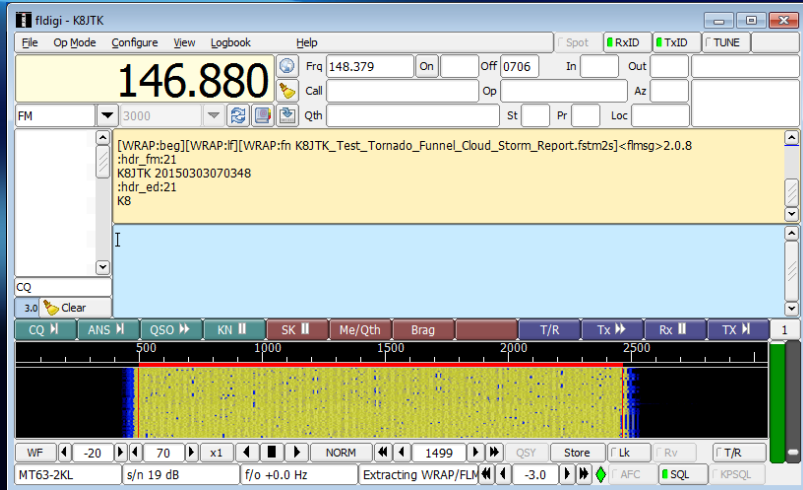
Application Examples

(setup and use videos available at sdrplay.com)



Fldigi Digital Decoding

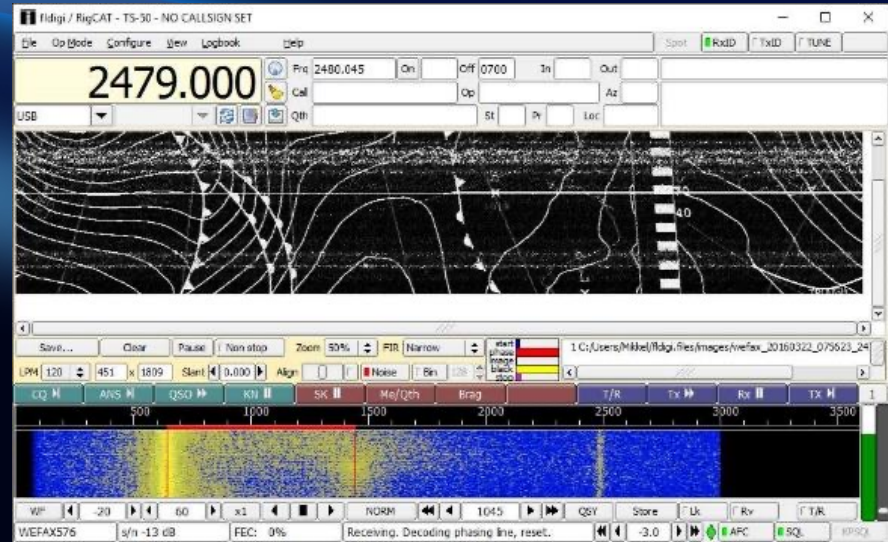
Fldigi NBEMS (Narrow Band Emergency Messaging System)



Credit: Jeff Kopcak, k8jtk

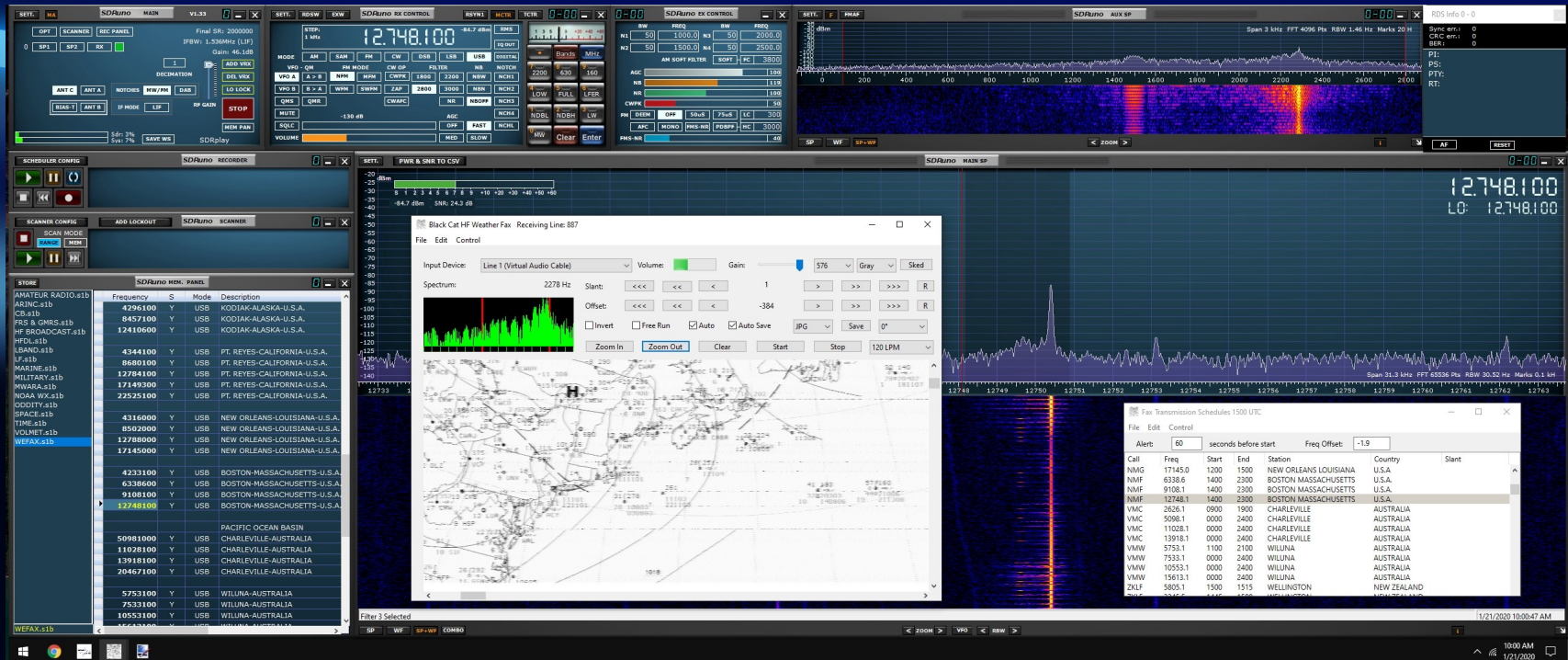
Fldigi:
<http://www.w1hkj.com>

...and WEFAX Decoding



Credit: Erik Mikkel Wied

HF Weather Fax



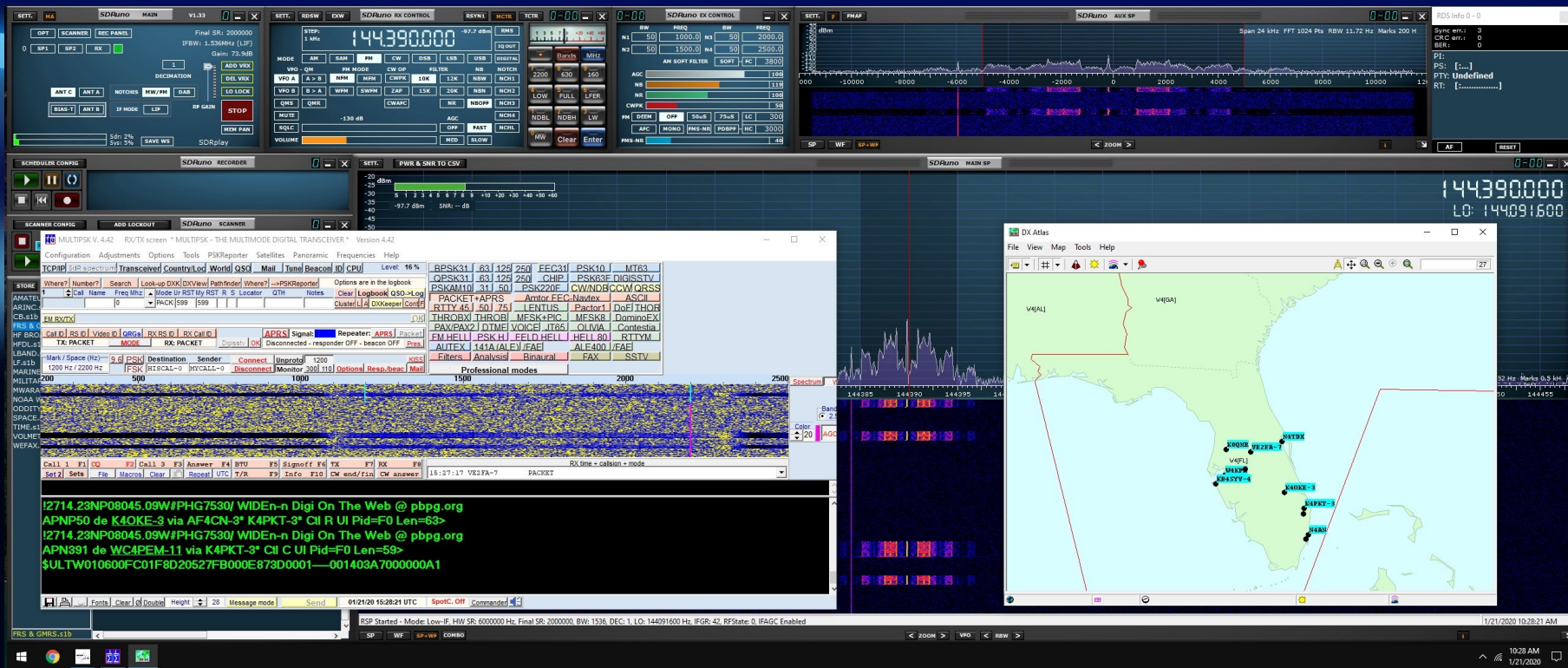
Black Cat Systems:
<https://www.blackcatsystems.com>

Credit: Mike Ladd, KD2KOG

www.sdrplay.com



MultiPSK



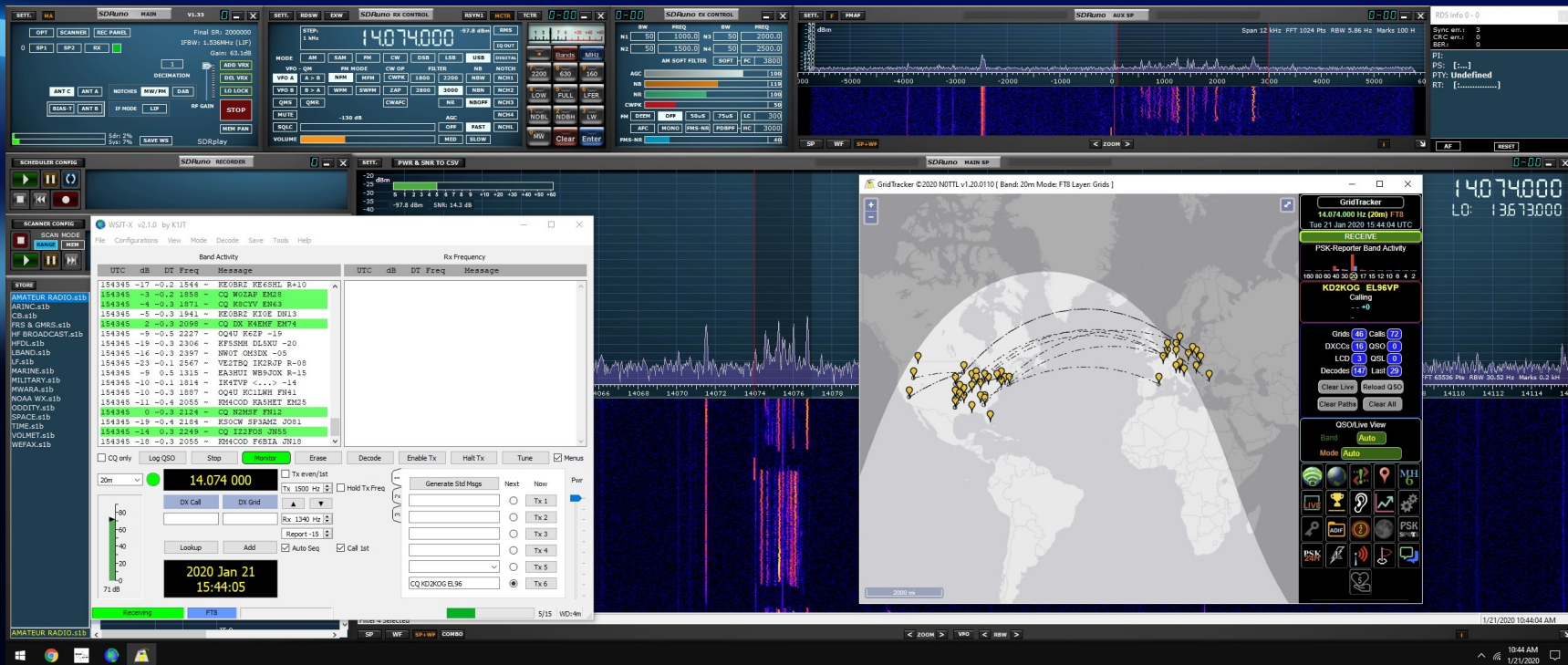
MultiPSK:
http://f6cte.free.fr/index_anglais.htm

www.sdrplay.com

Credit: Mike Ladd, KD2KOG



WSJT-X and GridTracker



WSJT-X: <https://physics.princeton.edu/pulsar/K1JT/wshtx.html>

GridTracker: <https://tagloomis.com/grid-tracker/>

www.sdrplay.com

Credit: Mike Ladd, KD2KOG



CSV Userlist Browser

The screenshot shows the SDRplay software interface with the CSV Userlist Browser open. The main control panel at the top includes buttons for 'SCAN', 'SCHEDULED', and 'STOP'. The frequency display shows 9420000 Hz. The spectrum plot shows a signal at 9420000 Hz. The list of stations includes:

Frequency	S	Mode	Description
2300000	Y	AM	120 Meters 2.300-2.495
3200000	Y	AM	90 Meters 3.200-3.400
3900000	Y	AM	75 Meters 3.900-4.000
4750000	Y	AM	60 Meters 4.750-5.060
5800000	Y	AM	49 Meters 5.800-6.200
7200000	Y	AM	41 Meters 7.200-7.450
9400000	Y	AM	31 Meters 9.400-9.900
11600000	Y	AM	25 Meters 11.600-12.100
13570000	Y	AM	22 Meters 13.570-13.870
15100000	Y	AM	19 Meters 15.100-15.350
17480000	Y	AM	16 Meters 17.480-17.900
18900000	Y	AM	15 Meters 18.900-19.020
21450000	Y	AM	13 Meters 21.450-21.850
25600000	Y	AM	11 Meters 25.600-26.100

The map window shows the location of the selected station, and the table displays the station details:

kHz	UTC/PSN	Days/PI	Language	Station	Cou	Transmitter	Lat	Lon	M	k	Target
9420.000	1900-2000	1234567	Greek	VOICE OF GREECE	GRC	Avlis	38.3897	23.6069	150	323	CIRAF 6-11, 18, 27-29, 36
9420.000	2000-2100	1234567	Greek	VOICE OF GREECE	GRC	Avlis	38.3897	23.6069	150	323	CIRAF 6-11, 18, 27-29, 36
9420.000	2100-2200	1234567	Greek	VOICE OF GREECE	GRC	Avlis	38.3897	23.6069	150	323	CIRAF 6-11, 18, 27-29, 36

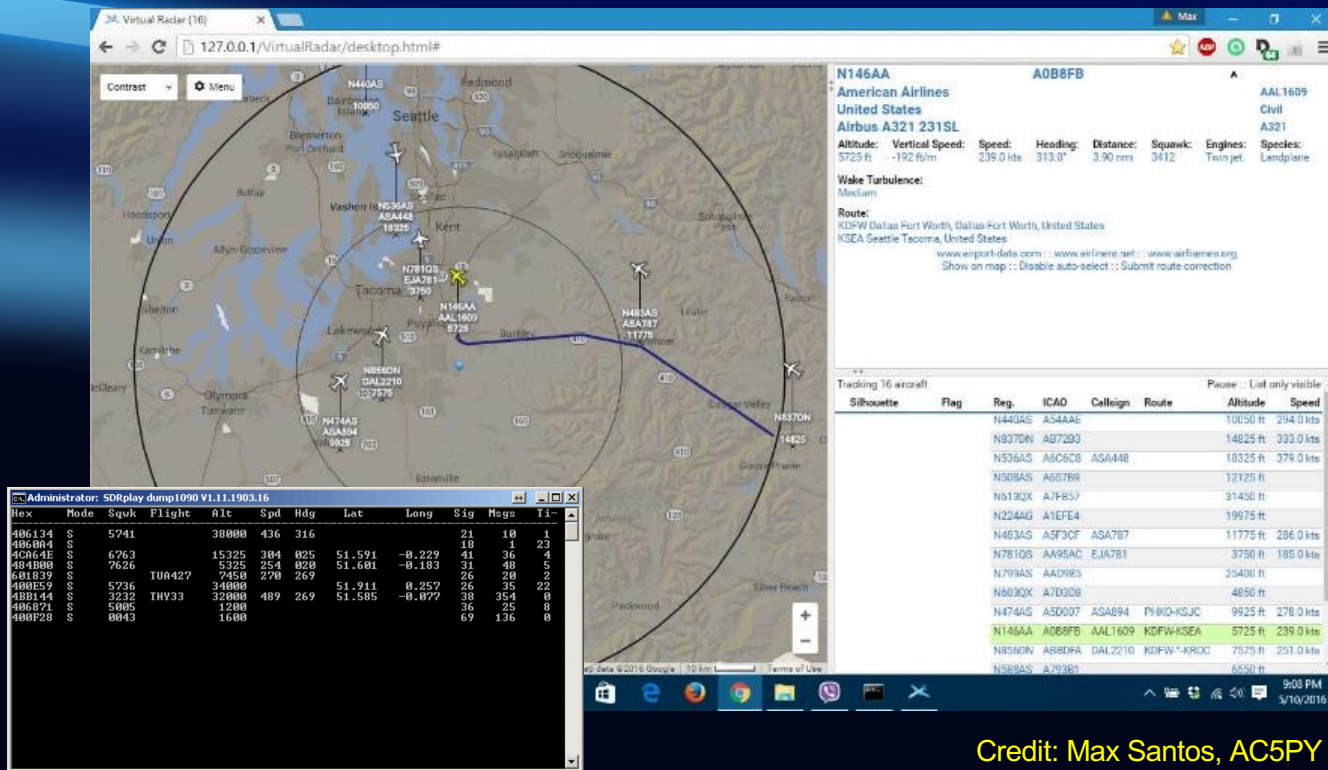
CSV User List Browser: <https://www.df8ry.de/htmlen/home/welcome.htm>

Credit: Mike Ladd, KD2KOG

www.sdrplay.com

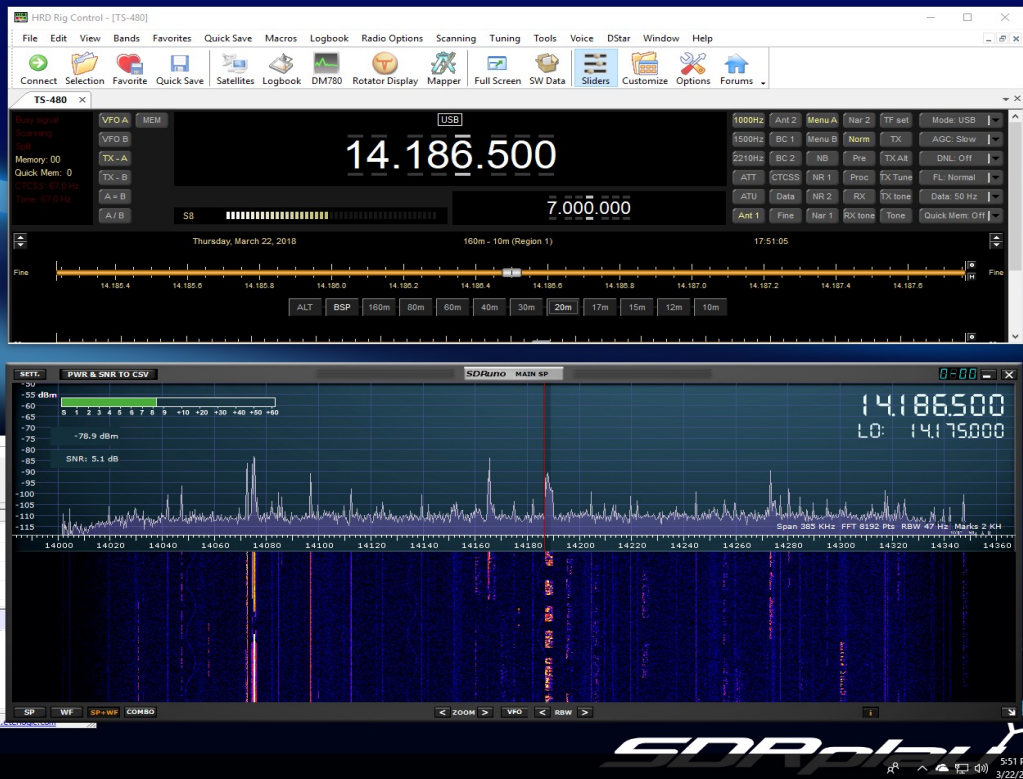
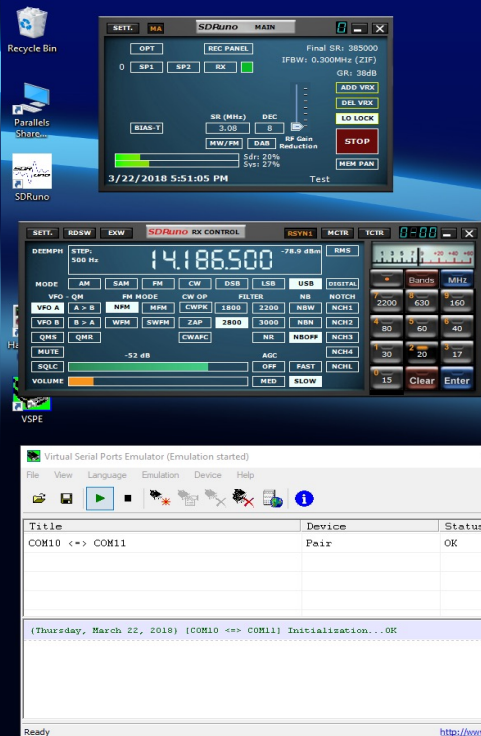


ADS-B decoding example using Dump1090 and VRS



Credit: Max Santos, AC5PY

Ham Radio Deluxe (including DM-780 and Logbook)



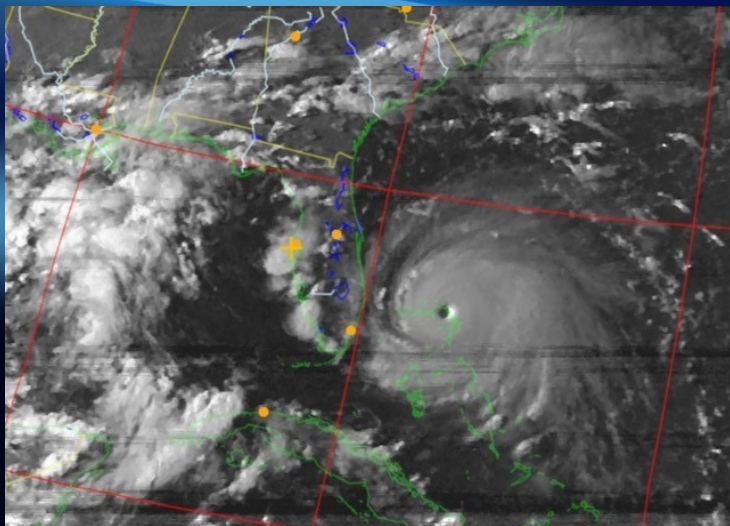
Ham Radio Deluxe:
<https://www.hamradiodeluxe.com/>

www.sdrplay.com

Credit: Steve Brightman, K15ENW

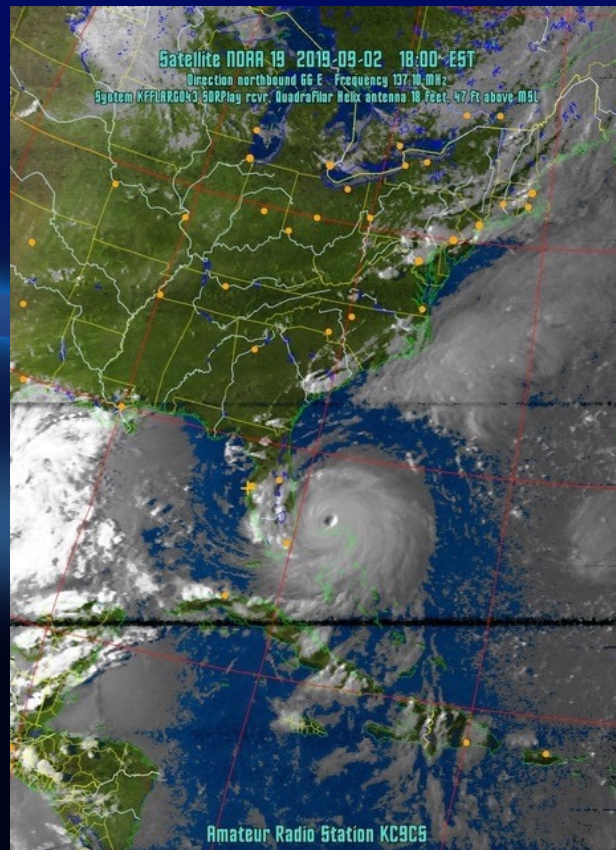


NOAA Weather satellite (137 MHz) - Wxtoimg (RSP1)



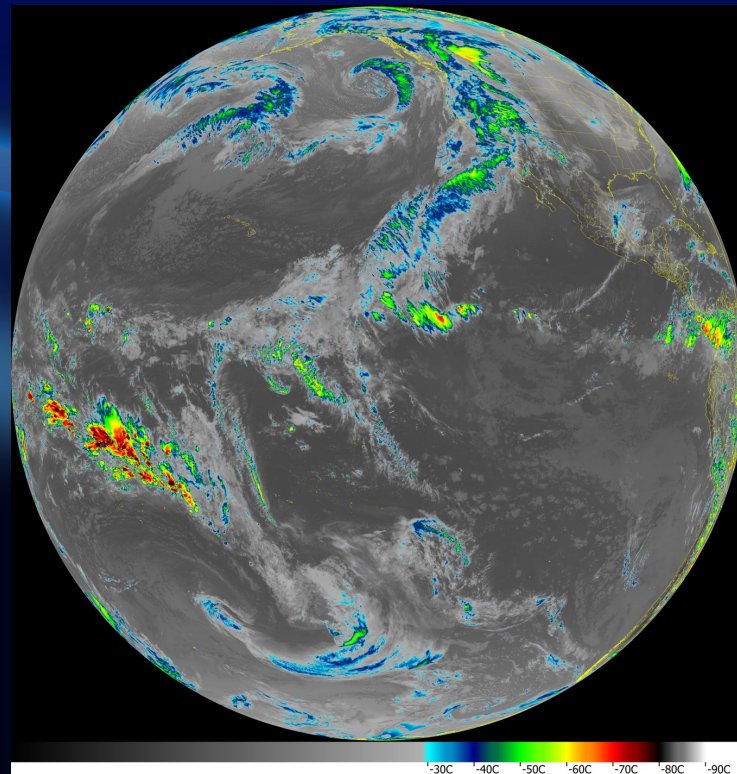
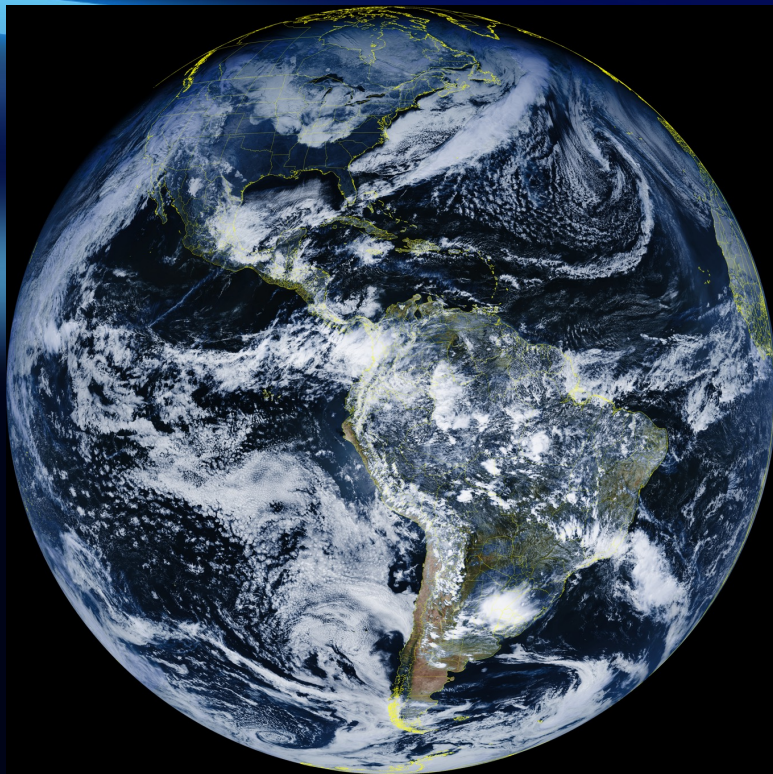
User pictures from the facebook group:
www.facebook.com/groups/sdrplay/

Wxtoimg:
<http://www.wxtoimg.com>



Credit: Hurricane Dorian by Bill Otten, KC9CS

High Resolution imagery received from the NOAA GOES 16 and GOES 17 satellites (1.7GHz)



Credit: Bern Bareis

www.sdrplay.com

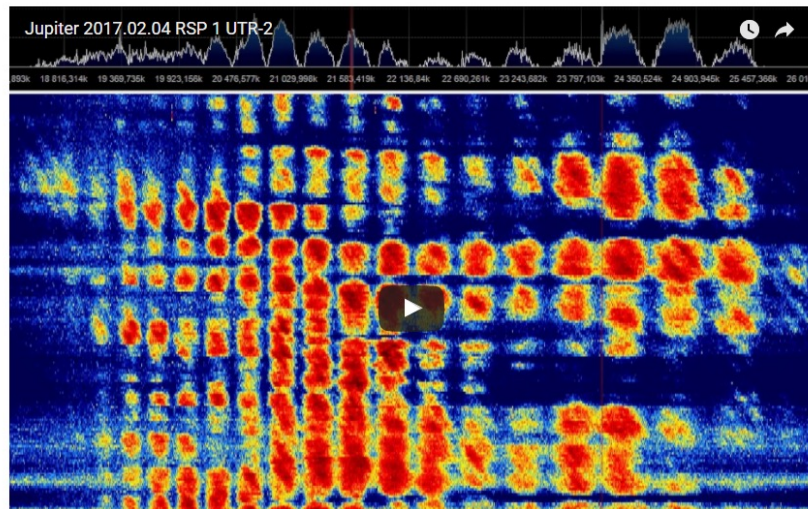


Tune in to Jupiter!

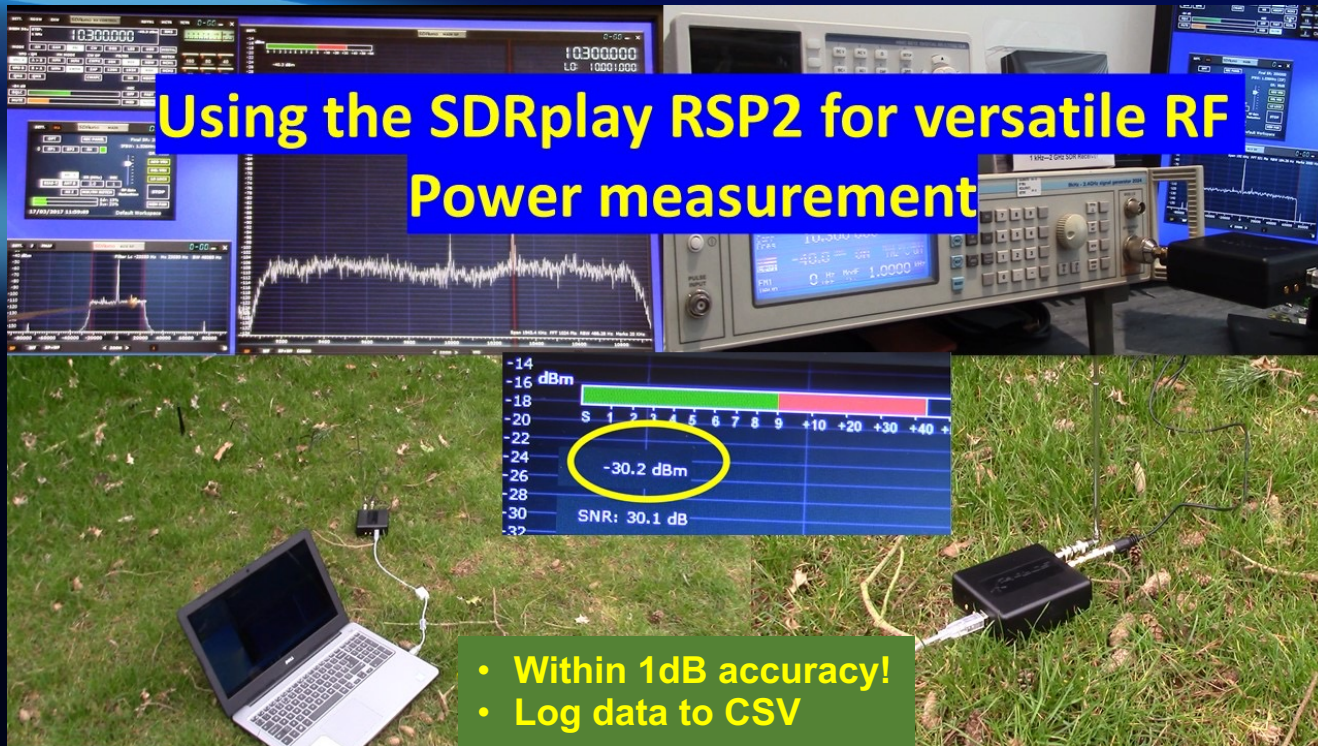
RECEIVING JUPITER NOISE BURSTS WITH AN SDRPLAY RSP1

Over on YouTube user [MaskitoSAE](#) has uploaded a video showing him receiving some noise bursts from Jupiter with his SDRplay RSP1. The planet Jupiter is known to emit bursts of noise via natural 'radio lasers' powered partly by the planets interaction with the electrically conductive gases emitted by Io, one of the planets moons. When Jupiter is high in the sky and the Earth passes through one of these radio lasers the noise bursts can be received on Earth quite easily with an appropriate antenna

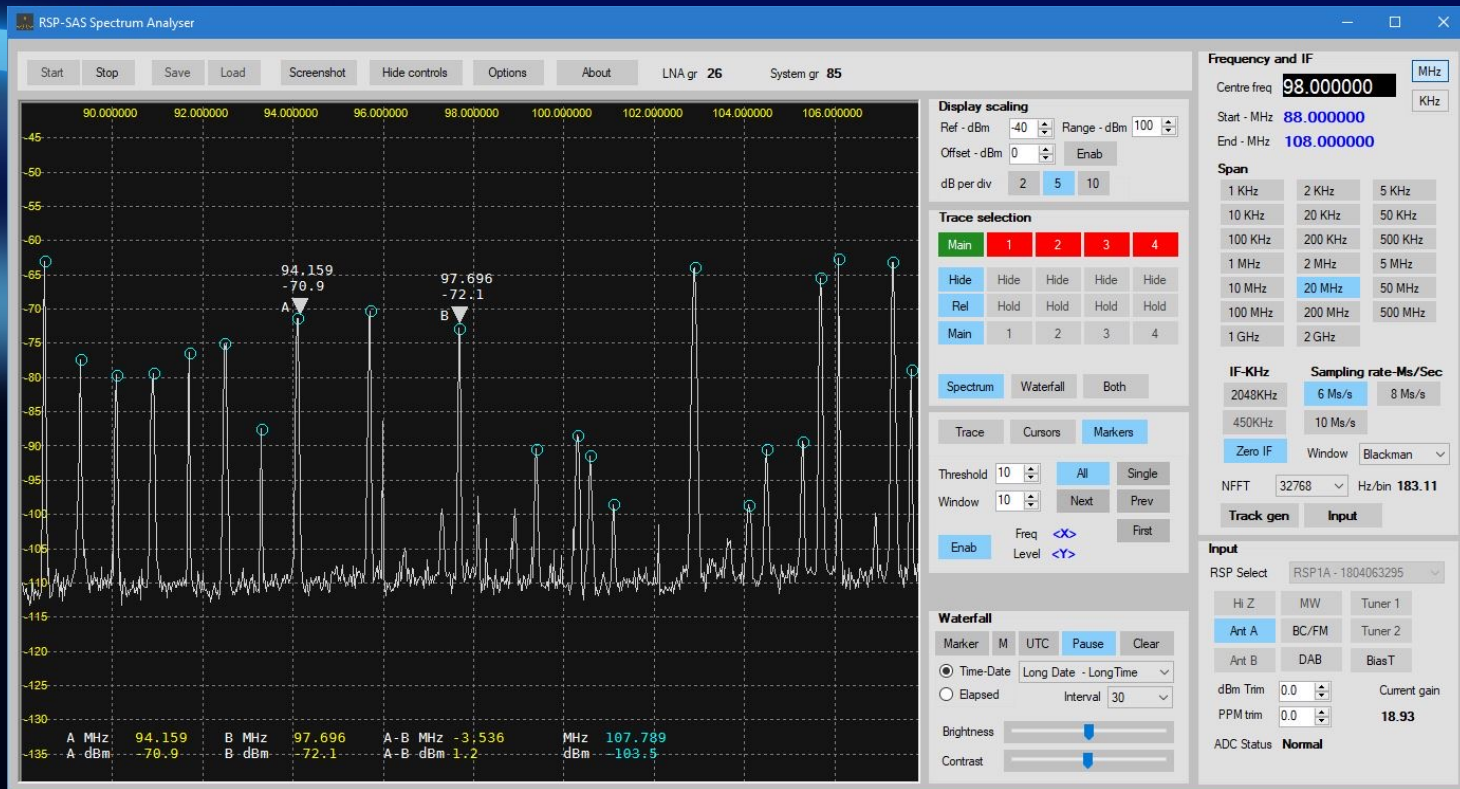
In his video [MaskitoSAE](#) shows the 10 MHz of waterfall and audio from some Jupiter noise bursts received with his SDRplay RSP1 at 22119 kHz. According to the YouTube description, it appears that he is using the [UTR-2 radio telescope](#) which is a large Ukrainian radio telescope installation that consists of an array of 2040 dipoles. A professional radio telescope installation is not required to receive the Jupiter bursts (a backyard dipole tuned to ~20 MHz will work), but the professional radio telescope does get some really nice strong bursts as seen in the video.



*Doubles as a new piece of RF lab kit:
an RF Power meter – get one for work or play!*



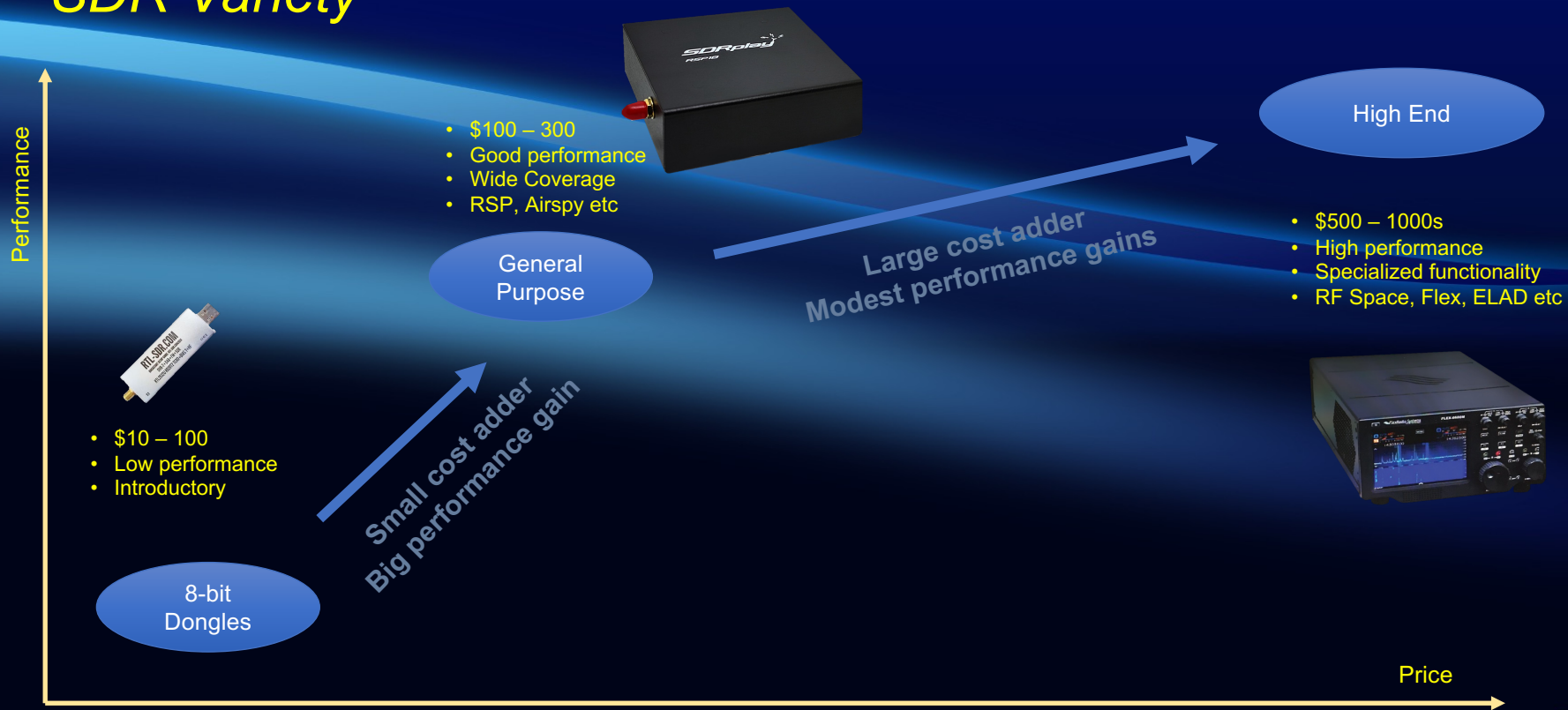
SAS Spectrum Analyser – Make your RSP into a Spectrum Analyser!



SDR hardware



SDR Variety



Review of SDR receivers

– what to consider:

- **Frequency Range:** The range of frequencies the SDR can tune.
- **ADC Resolution:** Higher is better. More resolution means more dynamic range, less signal imaging, a lower noise floor, more sensitivity when strong signals are present and better ability to discern weak signals.
- **Instantaneous Bandwidth:** The size of the real time RF chunk available.
- **RX/TX:** Can the radio receive and/or transmit?
- **Preselectors:** Analogue filters on the front end to help reduce out of band interference and imaging.
- **Software:** Is your favourite package supported? Does manufacturer provide software and support?
- **Price**

Instantaneous bandwidth illustration

RSP1A



RSP1B

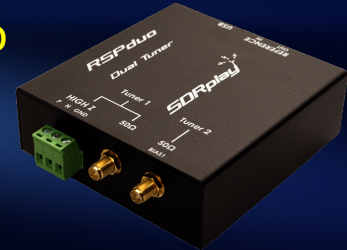
NEW



RSPdx



RSPduo



10 MHz visibility

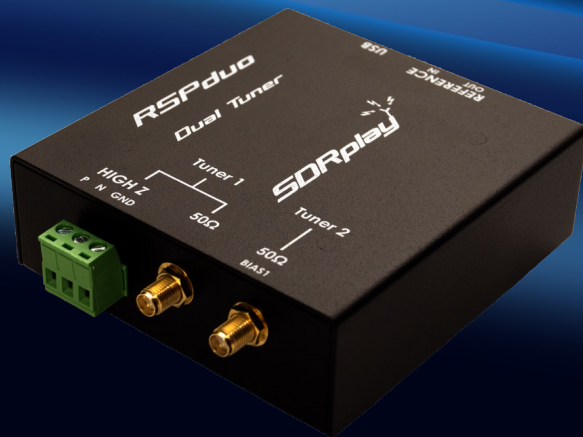
1kHz



2GHz

RSPduo - Dual independent tuners!

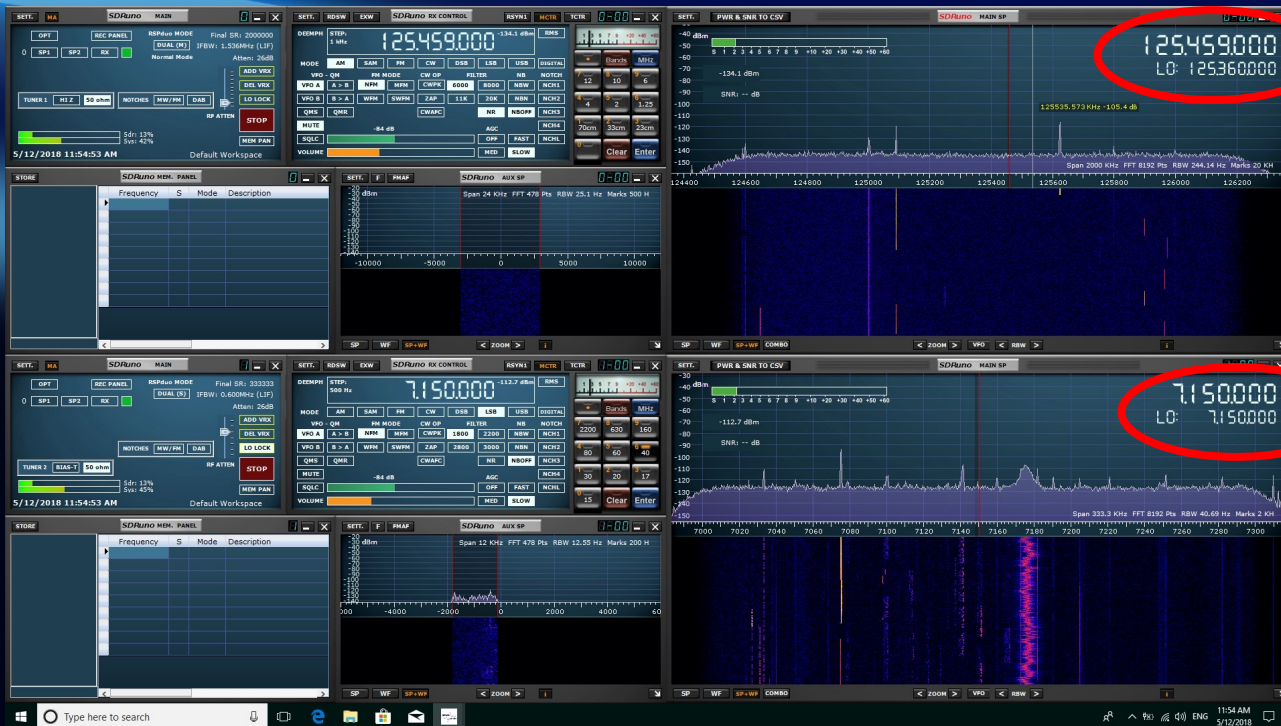
- Single 10MHz slice, like the other RSPs, or....
- Two independent “slices” anywhere in the coverage range



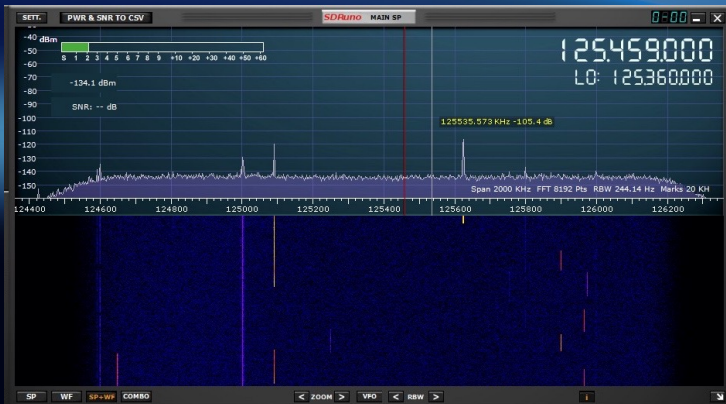
SDRplay Receivers – RSP Family Characteristics

- Continuous SDR receiver coverage from VLF to 2 GHz
- All the amateur radio bands from VLF to 23cm
- High performance ADC technology (not another compromise SDR!)
- Built-in high performance front-end filters
- Use as a stand-alone general coverage receiver, or as a high resolution panadapter
- Visualize all the signals in multiple bands simultaneously
- SDRuno™ (Windows) and SDRconnect™ (multi-platform) SDR software provided free-of-charge
- Works with 3rd party SDR software e.g. HDSDR, SDR-Console, CubicSDR, SDR++
- Runs on a Raspberry Pi – download SDRconnect
- Built-in remote operation (Client/server) - SDRconnect
- Ideal for portable operation (powered via USB)
- Can be used as a Spectrum Analyzer or an RF Power Meter
- Backed by the world's biggest and best SDR support community!

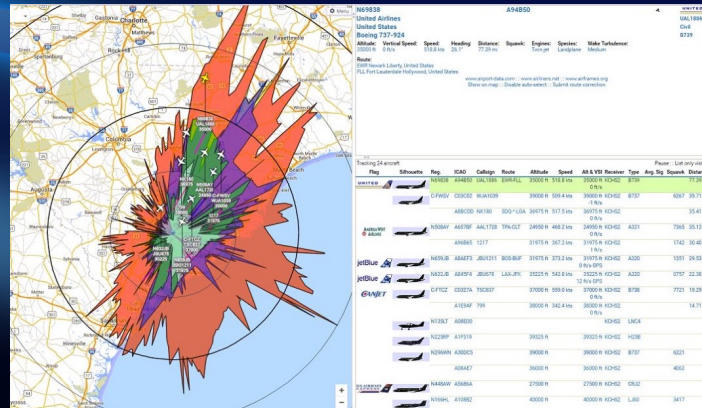
RSPduo - Monitor two widely spaced bands simultaneously!



RSPduo - Mix and match applications simultaneously!



ATC
~100MHz



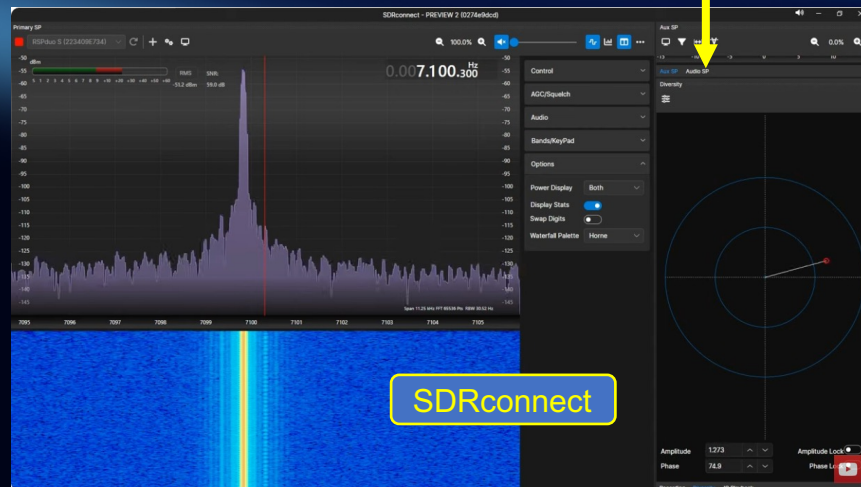
ADSB
~1GHz

RSPduo - Diversity Tuning!!!



New Diversity Panel
(shows phase and amplitude)

- RSPduo only
- MRC (Maximum Ratio Combination) for noise reduction (AUTO mode, SDRuno)
- Interference Rejection (Manual mode)



RSPdx – Multiple Inputs & HDR



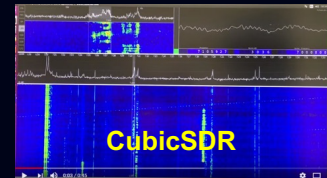
- Improved replacement for RSP2/pro
- 3 Software selectable inputs
- Additional 500kHz LPF for LF/VLF
- HDR mode for enhanced performance under 2MHz
 - Great for Dxers!
- Notch filters on all inputs
- BNC input for reception up to 200MHz
- Rugged steel case

Software



Software

- SDRplay owns and develops our own SDR software, optimized for the RSP family:
 - SDRuno™ - Full-featured Windows software - Scanner & Scheduler
 - SDRconnect™ - Multi-platform, Windows, Mac, Linux, Raspberry Pi - Client / Server capability
- SDRplay also provides a multi-platform API specification enabling 3rd party software including: SDRConsole, HSDR, SDR++ and CubicSDR
- All the above software packages are available **free of charge!**
- Supports 3rd party software e.g, Loggers, Digital Decoders, Plugins and Modules



Multiple VFOs & different decode modes - simultaneously!

The screenshot displays the SDRplay software interface, which includes a main control panel and several floating windows. The main panel shows three VFOs (VFO A, VFO B, and VFO C) with their respective frequency displays and mode selectors. VFO A is set to 14.095.8 MHz, VFO B to 14.076.000 MHz, and VFO C to 14.230.000 MHz. The interface also features a signal strength meter, a spectrum analyzer, and a waterfall plot. The floating windows show the RX-SSTV v2.0.0 interface and the WSJT-X v1.7.0 by K1JT interface, which displays a list of decoded signals.

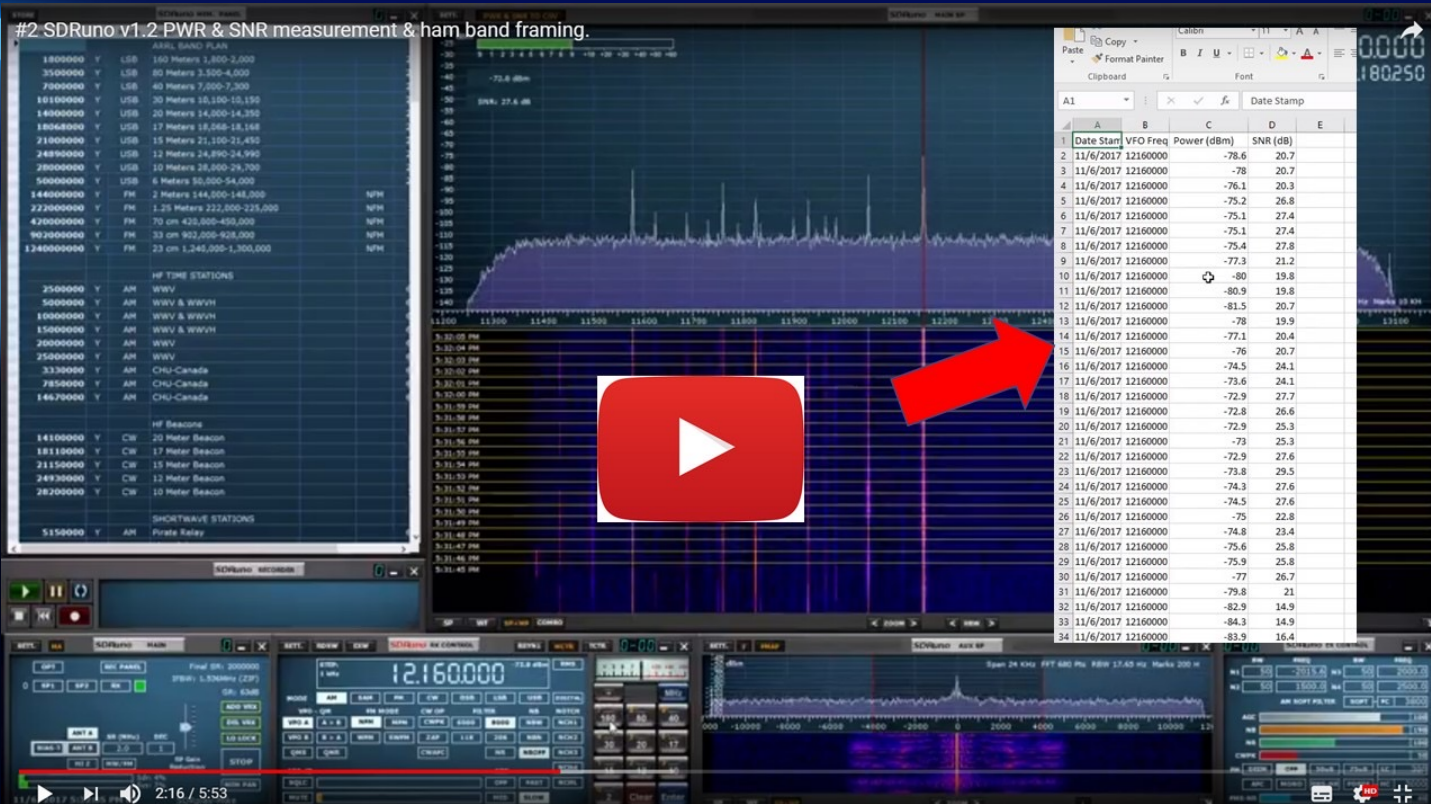
WSJT-X - Copy1 v1.7.0 by K1JT

UTC	dB	DT	Freq	Drift	Call	Grid	dBm	km
1504	-16	2.1	14.097075	0	W4KDN	FM07	20	631
1504	-12	0.6	14.097085	0	W4MO	EL86	33	1876
1504	-16	0.7	14.097096	0	W4MO	EL87	37	1767
1504	-9	2.9	14.097097	0	K5NCA	EM30	23	1846
1504	-24	0.6	14.097126	0	W4MO	EL87	37	1767
1504	-22	0.6	14.097150	0	W0IVJ	DM79	23	2164
1504	-17	0.7	14.097153	0	N5EN	EL29	20	2051

WSJT-X - Copy2 v1.7.0 by K1JT

UTC	dB	DT	Freq	Message
1503	-17	0.5	1006	# K1GWN K5TU RRR
1503	-15	0.5	822	# K3ODX AI6MQ -16
1504	-4	2.7	1168	# XE2SIV K5YOL R-09
1505	-1	0.9	403	# CQ DX NETZH EM41
1505	-1	-2.2	715	# CQ KGSHTM EM02
1505	-12	0.5	1006	# K1GWN K5TU 73
1505	-18	0.4	1164	# K5YOL XE2SIV -25
1505	-12	0.5	821	# K3ODX AI6MQ -16

RF power level + SNR measurement & logging



Scanning – scan a range of frequencies or your own preset frequencies

The screenshot displays the SDRplay software interface with several windows and callouts:

- SDRplay MAIN:** Shows the main control panel with buttons for OPT, SCANNER, REC PANEL, and RX. The frequency is set to 124300000 Hz. A callout points to the "Scan to or from Memory Banks" button.
- SDRplay RX CONTROL:** Shows the receiver control panel with buttons for DEEMPH, STEP, and various filters. A callout points to the "Scan to or from Memory Banks" button.
- SDRplay AUX SP:** Shows the auxiliary spectrum plot with a callout pointing to the "Scan to or from Memory Banks" button.
- SDRplay MAIN SP:** Shows the main spectrum plot with a callout pointing to the "Scan to or from Memory Banks" button.
- SDRplay MEM. PANEL:** Shows a list of memory banks with columns for Frequency, S, Mode, and Description. A callout points to the "Lock out unwanted freqs" button.
- Scanner Config 0:** A dialog box showing preset ranges and scanning parameters. A callout points to the "Preset or user-defined scan ranges" button.

Scanner Config 0

PRESET RANGES: AIRBAND (NA)

START FREQ: 118000000 Hz

STOP FREQ: 136975000 Hz

STEP FREQ: 25000 Hz

HOLD TIME: 5 Sec

THRESHOLD: -80 dBm

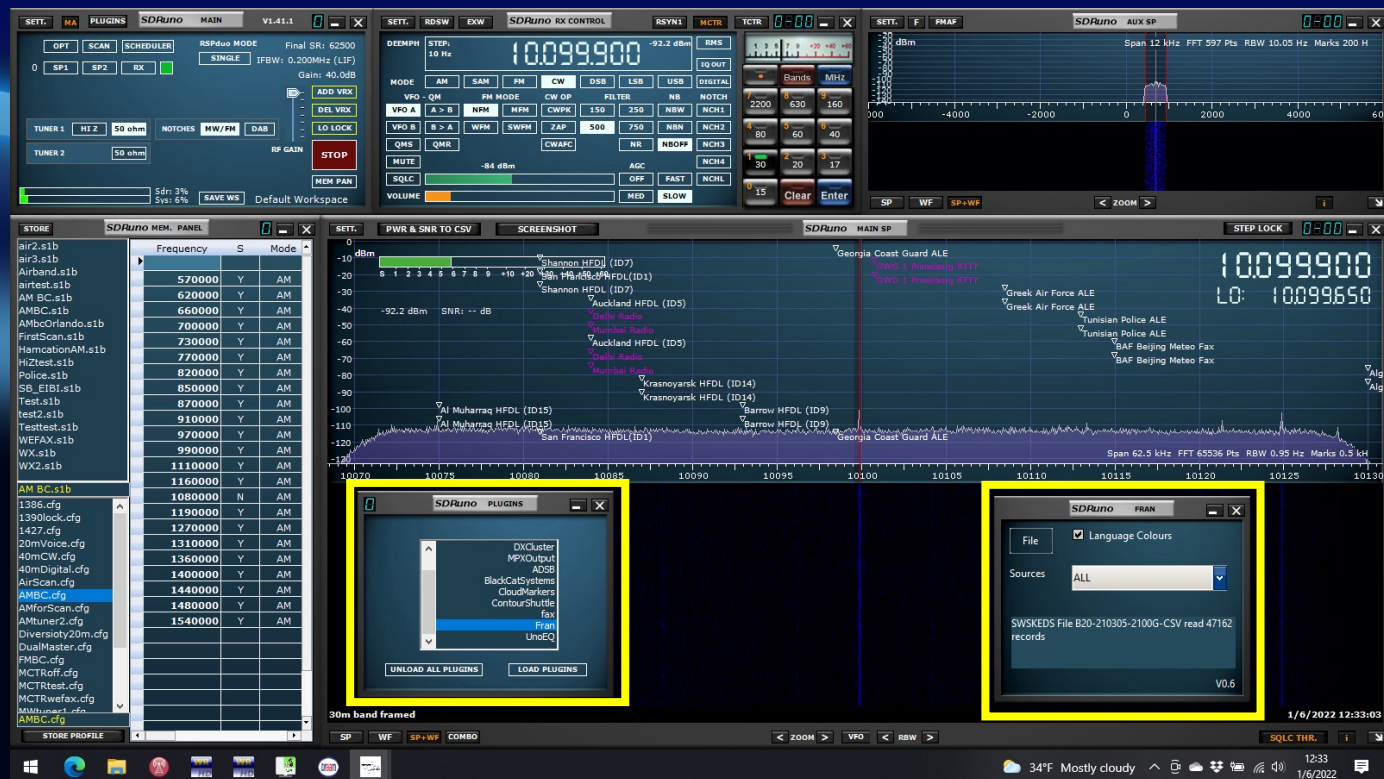
WAIT ON SIGNAL? ☒ SAVE TO MEM PANEL? ☐

DISPLAY THRESHOLD? ☒ CONT. LOOP? ☒

SDRplay

Plugins

- Enhance receiver capabilities:
 - Annotation
 - Decoders
 - Controllers
 - 3rd party Interface
 - Recorders
- SDRplay or 3rd party development



Scheduler

The screenshot displays the SDRplay software interface with the Scheduler Event Editor dialog box open. The dialog box is titled "Scheduler Event Editor" and contains the following fields and options:

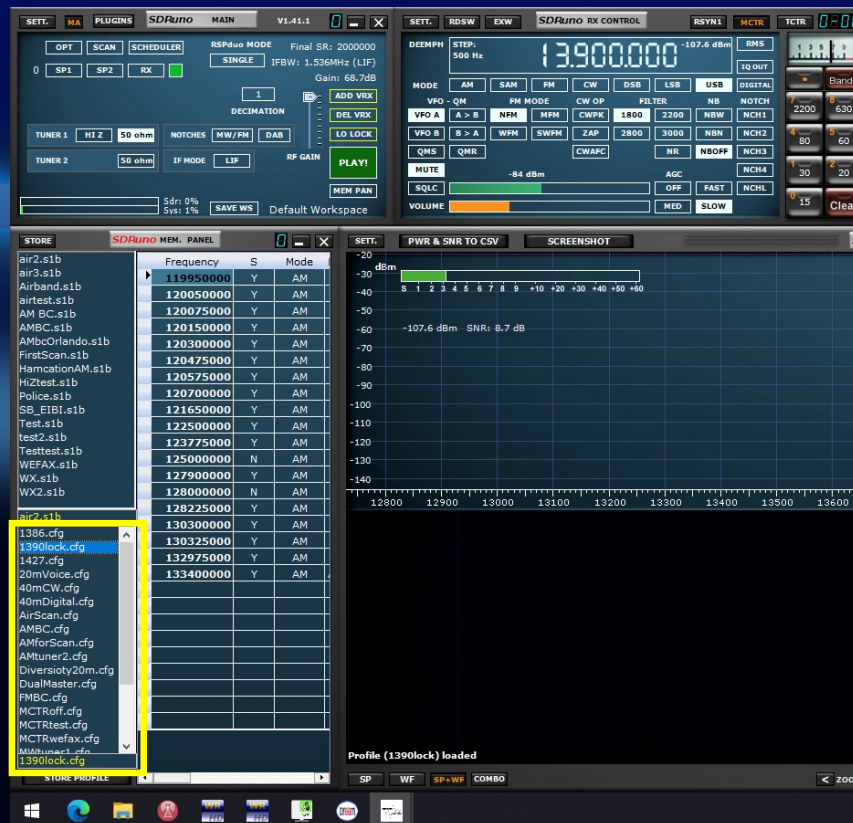
- Event Time:** START 13:24:00, END 13:54:00, DURATION 00:30:00.
- Title:** TITLE Event 3.
- Event Start Date:** START 28 July 2021.
- Event Recurrence:** None, Hourly, Daily, Weekly, Monthly.
- Event End:** End By 28 July 2021, End After 1 occurrences, No End Date.
- Alerts:** Enable Alert (checked), 5 Minutes before event for alert.
- FUNCTION:** Play.
- PROFILE:** None.
- VFO:** 7798000 Hz, ACTIVE VRX 0.
- PLUGINS:** None, ADSB, AudioRecorder, DAB, DXCluster, MPXOutput, BlackCatSystems, CloudMarkers, ContourShuttle, Fax, Fran, UnoEQ.

The background interface shows the SDRplay MAIN window with various controls and a SDRplay MEM. PANEL window displaying a list of frequencies and modes.

Start	Stop (Duration mm:ss)	Name	Repeat	Profile	Function	Alert (mm:ss)	Active VRX	VFO (Hz)	Plugins
2021/07/28 08:00	No End Date (0)	Power 1	Every 1 Hour	None	Play	5	0	7100000	None
2021/07/28 08:01	No End Date (0)	Power 2	Every 2 Hours	None	Play	5	0	7200000	None
2021/07/28 08:03	No End Date (0)	Power 3	Every 3 Hours	None	Play	5	0	7300000	None
2021/07/28 08:11	No End Date (0)	Event 3	None	None	Play	5	0	7400000	None

Profiles

- Ensure receiver is set up correctly for:
 - Scheduled events
 - Specific user scenarios
- Store a complete set of radio parameters including:
 - LO and VFO
 - Sample rate (SR and DEC)
 - Gain
 - Input selection
 - Notch filters
 - VRX settings
- Examples:
 - AM broadcast
 - HF CW or FT8
 - FM Broadcast

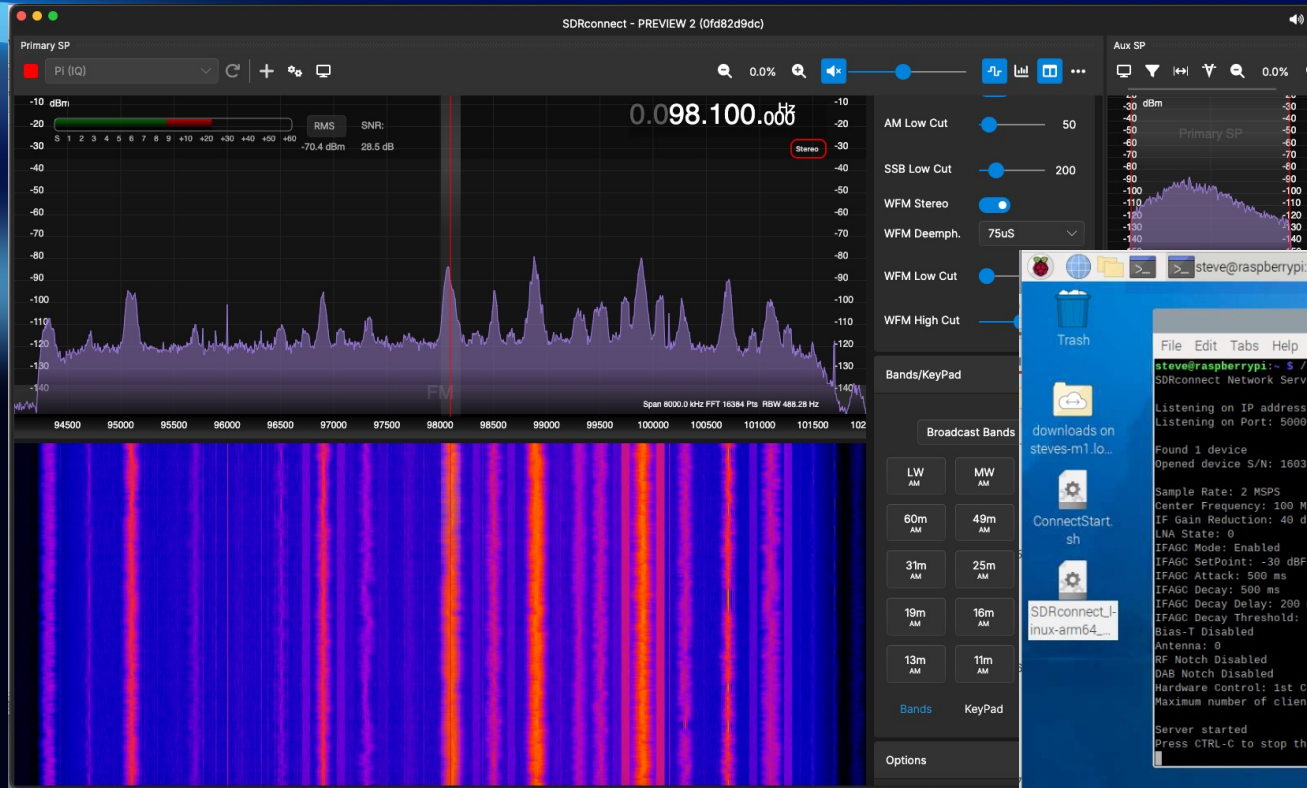


Introducing SDRconnect

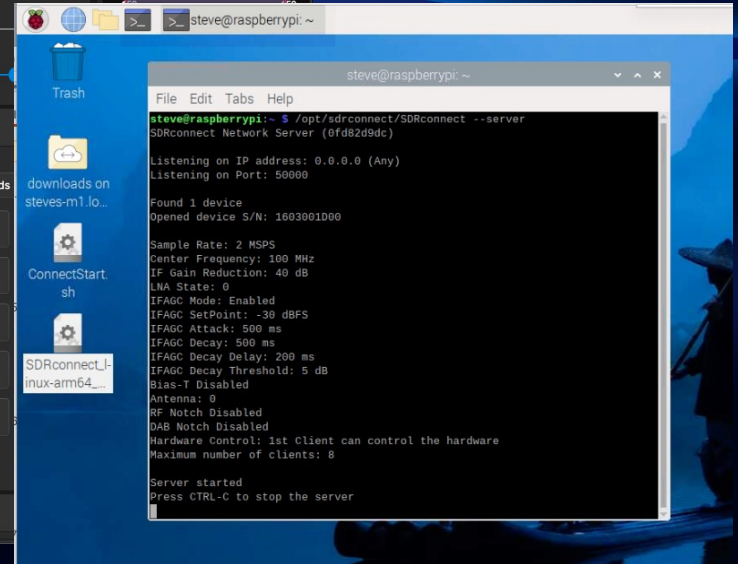
- Complete rewrite of SDRuno
 - Both SDRuno and SDRconnect can be installed on the same machine
 - SDRuno v1.42 will continue to be supported (bug fixes etc only)
- Cross Platform (64-bit: MacOS, Linux, Windows, Raspberry Pi)
- New Remote Server and Client (cross platform)
 - Access your RSP from anywhere – home LAN or across the internet!
- Complete GUI rewrite and update
 - More intuitive / easy to use interface
 - Ability to lock panels together
- Modular architecture
 - Easily add additional functionality
- Compatible with all current RSPs (RSP1A, RSP1B, RSPdx, RSPduo)
 - Compatible with RSP2 & RSP2pro discontinued products
 - Due to hardware limitations the RSP1 is not supported, but SDRuno 1.42 can still be used
- **Public Preview release available** (see <https://www.sdrplay.com/sdrconnect/> for updates)
 - *Additional features to be added when available*



SDRconnect - Example screenshot



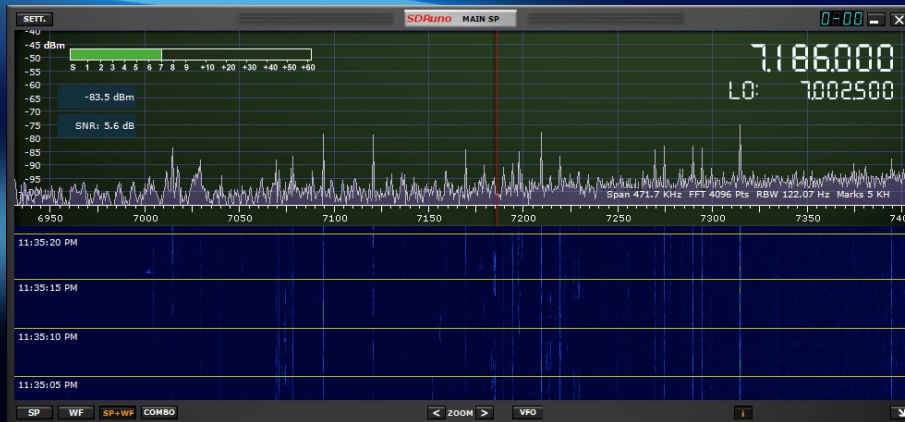
Mac Client connected to
Raspberry Pi Server



Panadapters



What is a Panadapter?



*“Go-to” choice for Kenwood,
Yaesu, Icom, Elecraft etc!*

- “Panadapter is short for Panoramic Adapter. The simple answer is that it allows us to see a panoramic display of the band our radio is tuned to. We can see every signal”*.
- Early implementations used a PC soundcard to achieve this function but were therefore limited to 200 kHz of bandwidth because they rely on the sound card.
- The advent of affordable SDR hardware such as the RSP1A has allowed implementations with much greater bandwidth, and hence much more usefulness.
- Combined with readily available, and capable, SDR software Panadapters are now an affordable and easy to implement reality!

* Definition courtesy KA9MOT <http://mypanadapter.com/>

Why panadapter?

- Add new capabilities / visibility to any rig
- Synchronize the the rig to the software if it has a CAT port
- Work one frequency while monitoring the whole band
- Monitor multiple bands in addition to the one you're working
- Arbitrarily large spectrum scope
- Less cost, more features than factory add-ons,



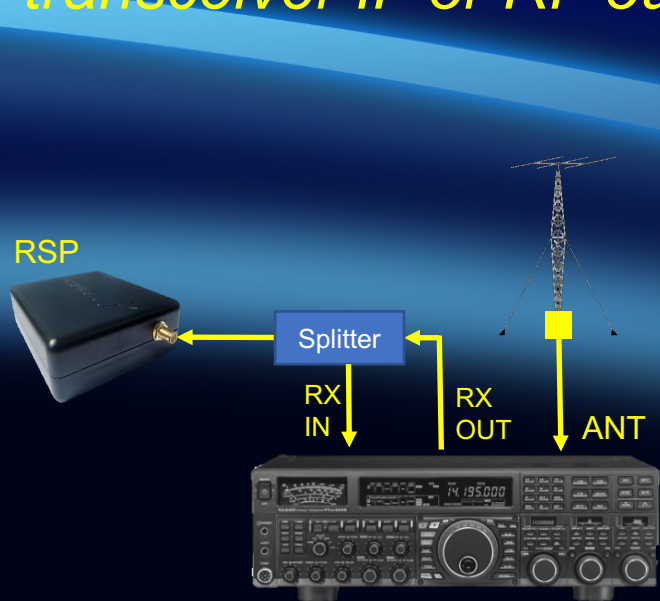
Monitoring 3 bands with SDRuno



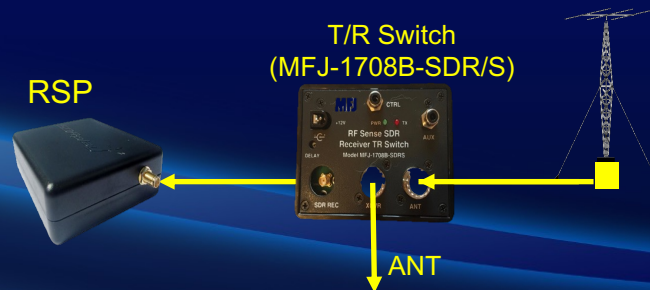
The perfect Panadapter companion for your rig

- Any of the SDR Software programs that support RSPs can be used to provide a basic spectrum display.
- SDRUno, HDSDR, SDR Console and CubicSDR have built-in capabilities for CAT and other add-on software, to allow for communication between the SDR software and the transceiver.
- OmniRig is commonly used for synchronization/control between the Tx and SDR Rx, but other control software, e.g. HRD, DXlab etc. can be incorporated using SDRUno's CAT capability
- ***App notes and videos available from sdrplay.com***

Use a T/R switch if not using protected transceiver IF or RF out!



- RSP protected by rig's internal T/R
- Splitter if required (e.g. Yaesu)
- RX BW limited by IF



- RSP protected by T/R
- T/R shares signal
- Widest RX bandwidth
- *Always connect PTT!*



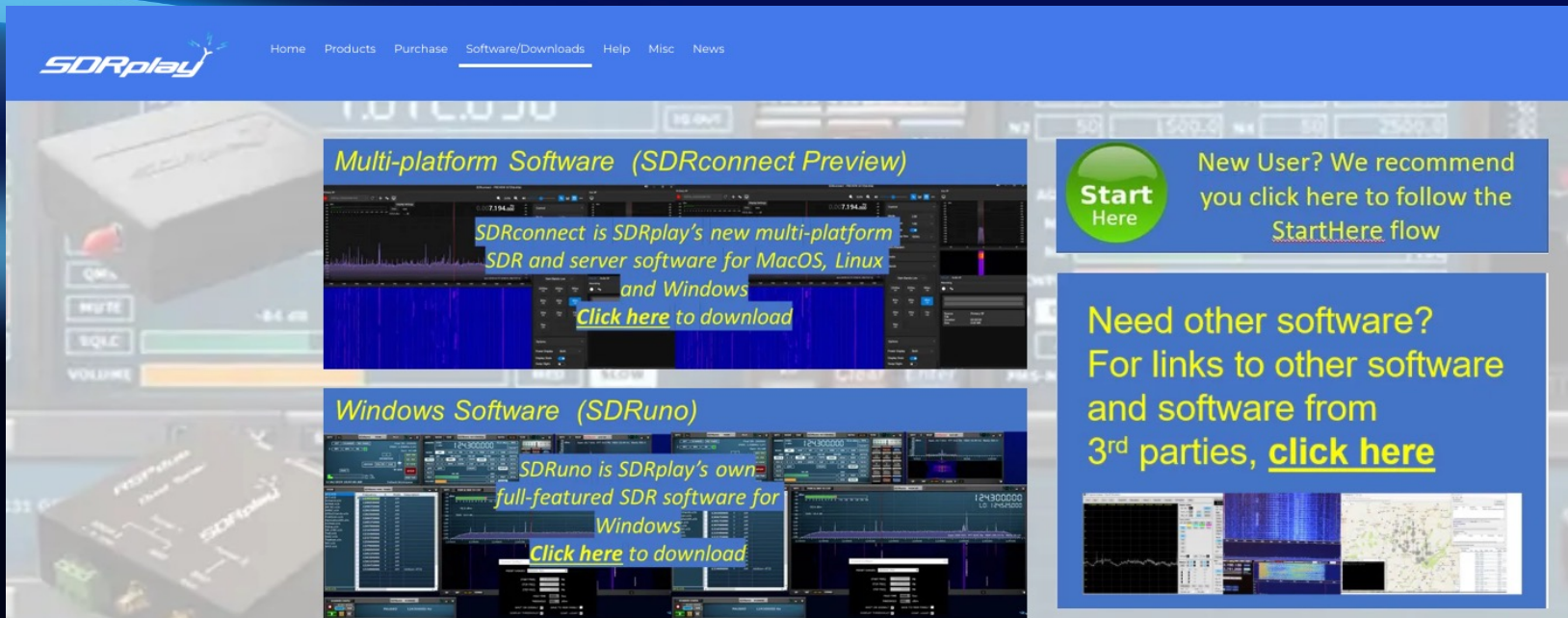
- RSP protected by rig's internal T/R
- Direct connection (e.g. Kenwood TS-590SG)

Support and further information



SDRplay.com – Your gateway to information

Software Downloads



SDRplay Home Products Purchase Software/Downloads Help Misc News

Multi-platform Software (SDRconnect Preview)

SDRconnect is SDRplay's new multi-platform SDR and server software for MacOS, Linux and Windows
[Click here to download](#)

Windows Software (SDRuno)

SDRuno is SDRplay's own full-featured SDR software for Windows
[Click here to download](#)

Start Here New User? We recommend you click here to follow the [StartHere](#) flow

Need other software? For links to other software and software from 3rd parties, [click here](#)

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SDRplay

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DOCUMENTATION & VIDEO CATALOGUE (PREVIOUSLY CALLED "APPLICATIONS AND SUPPORT CATALOGUE")

The SDRplay Documentation and Video Catalogue is your reference point for documentation, application Notes, how-to videos and much more. You can select by category and sub-category or choose to search "all categories". You can search by keyword and decide whether to include links to third party content. For more detailed information on each item, hover over the icon. Clicking will give access to the video or document.

Select Category to search on RSP Hardware **SDRplay Software** 3rd Party Software Other Hardware Miscellaneous

Select Sub-Category Applications Articles SDR Connect Documentation Non-Windows platforms Basics SDRuno Webinars Non English

Search selected area for term SEARCH Include Third Party Content? ☐ Search ALL Categories? ☐

Searches on full words of more than 2 characters. Returns instances of either term if more than 1. Returns nothing when too many hits (eg SDRuno)

Description click for more details		Created
VID562 SDRuno v1.40.2 Profiles		02-Dec-2020
VID556 SDRuno basics Virtual audio cable		28-Oct-2020
VID658 Tech Minds demonstrates SDRconnect		08-Dec-2023
VID687 A run through SDRconnect capabilities as of 12/23		06-Dec-2023
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VID647 SDRconnect layout options		10-Aug-2023
VID650 Introducing the SDRconnect audio recorder module		10-Aug-2023
VID635 Pre release demo of SDRconnect		12-Jul-2023
VID623 SDRuno Band Framing Customization		22-Aug-2022
VID620 Adding and manipulating memory banks in SDRuno		11-Jul-2022
DOC610 Installing the SDRplay RSP API on an M1 Mac		09-Oct-2021
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VID597 SDRuno v1.41 Introduction		29-Jul-2021
VID600 ADSB plugin preview		28-Jul-2021
VID555 Using Virtual Audio Cables		28-Oct-2020
VID546 SDRuno FAQ Installation		14-Sep-2020
VID542 Loading 3rd Party Plugins		04-Sep-2020
VID539 SDRuno DAB plugin		20-Aug-2020
VID538 SDRuno Audio Recorder Plugin		17-Aug-2020
VID537 SDRuno DX Cluster plugin demo		14-Aug-2020
VID535 SDRuno Improved Squelch		09-Aug-2020

- Searchable
- Literally hundreds of documents and videos!

How-to videos: SDRplay YouTube Channel

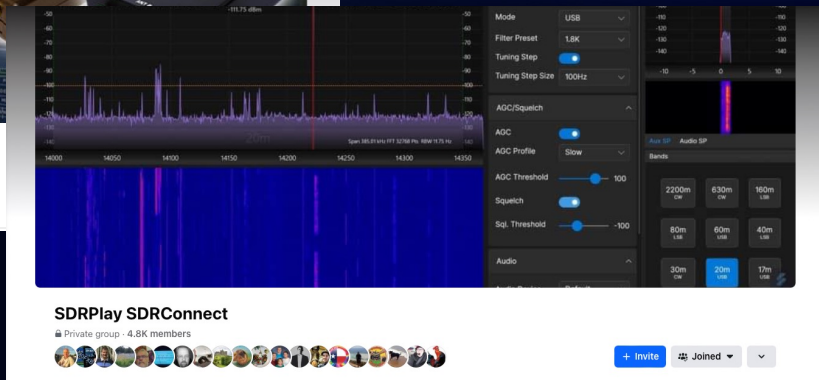
[illegible]

www.youtube.com/c/SDRplayRSP

www.sdrplay.com



Facebook Groups



More than 20,000 users
helping each other!

Direct support from SDRplay

Welcome to Help

	Community Help Forums and groups		New User? Guided Installation Walk through
	Get answers to your technical questions		Help with SDRconnect & Bug reporting
	Documentation & Video Catalogue		Where's my order?
	Which RSP is for you? Product Family Information		Other Questions
	Check status of your help ticket		Damaged your RSP? Repair Centres

For more information:

Thank You!

- Company website: www.sdrplay.com
 - Check out the **Applications & Support Catalog** at:
<https://www.sdrplay.com/apps-catalogue/>
- Users Forum: <https://groups.io/g/SDRPlayUsers>
- Email: support-usa@sdrplay.com
- Facebook: [SDRplay](#), [SDRuno](#) and [SDRconnect](#) specifically
 - Independent groups run by enthusiastic users!
- **Where to purchase?**
 - Ham Radio Outlet (US): <https://www.hamradio.com>

*See our demo at
the HRO booth!*