

# Add an SDR Receiver to Any Ham Radio

Improve your receive performance, without compromising your main transceiver, using an SDR switch with an LNA.

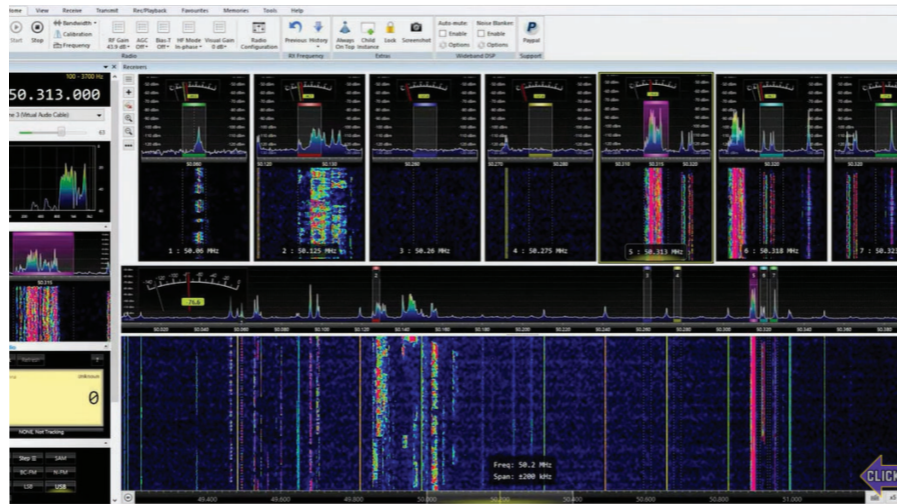
**Hayden Honeywood,  
VK7HH/KD9SSB**

Hayden Honeywood, VK7HH/KD9SSB, shares practical projects and tutorials for hams around the world on his YouTube channel, *Ham Radio DX*. The information in this article comes from one of his more recent videos, “Add a SDR Receiver to ANY Ham Radio Rig!” ([www.youtube.com/watch?v=\\_TEgRoLsSoc](http://www.youtube.com/watch?v=_TEgRoLsSoc)).

I’m passionate about the 6-meter band and working all the DX entities on it, so improving the receive performance of my station is my number-one priority. Recently, I came across a couple of images that piqued my interest in using an affordable software-defined radio (SDR) with my own station.

The first image I saw, shared online by Paul Newcombe, N2EME, showed the entire 6-meter band being received simultaneously using nothing more than a \$35 Nooelec RTL-SDR dongle (see Figure 1). With this setup, the SDR isn’t being used as a panadapter, but as the receiver. CW and single sideband (SSB) signals were going to speakers, and all the *WSJT* frequencies were getting decoded simultaneously with individual instances of *WSJT* or *JTDX* running at once. In fact, you could have up to 24 receivers active at the same time, allowing you to monitor multiple frequencies. Running this setup requires a basic computer with enough power to run Windows — that’s all you need.

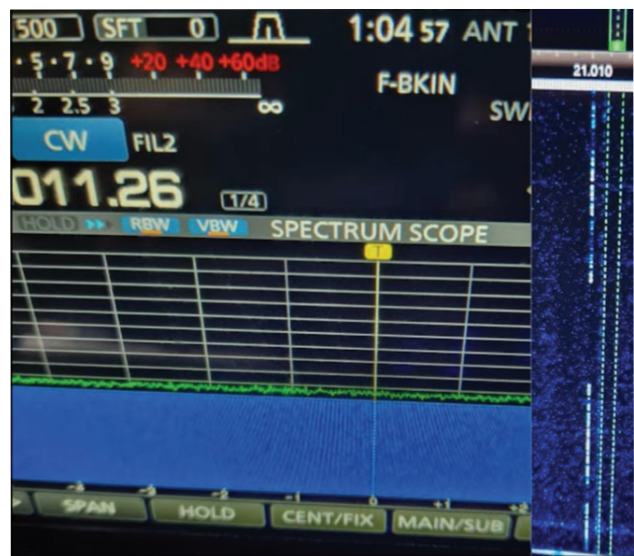
Additionally, Kirk Pengelly, NØKK, shared an image online (see Figure 2) that shows an IC-7610 and an Airspy HF+ SDR running side by side on *SDR Console* ([www.sdr-radio.com/console](http://www.sdr-radio.com/console)). Both were connected to the same antenna, attempting to receive the same station. The comparison revealed something striking: The signal was nearly invisible on the IC-7610’s waterfall, while *SDR Console* decoding with the Airspy HF+ clearly displayed the individual dots and dashes of the CW signal. This test, performed on the 15-meter band,



**Figure 1** — This setup allows you to monitor multiple frequencies and requires only a computer with enough power to run Windows. After reading the article, watch the companion video on YouTube.

showed just how powerful SDRs can be for weak-signal operating.

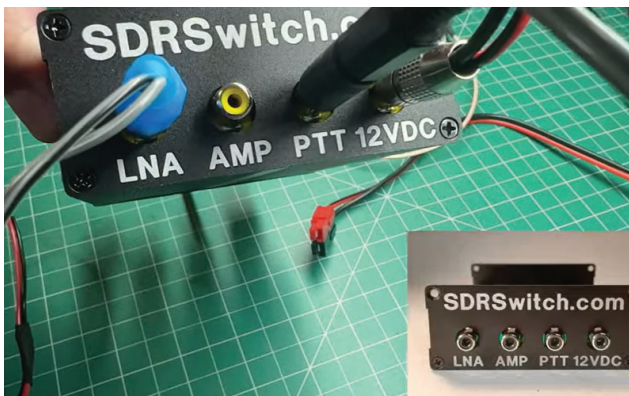
I wondered if I could replicate these results with my own IC-7610 and a bottom-of-the-range RTL-SDR. I’ve also experimented with other SDRs, including the



**Figure 2** — An IC-7610 and an Airspy HF+ SDR running side by side on *SDR Console*.

10m Band - WSPR Spots						
<b>All Spots (96h)</b>						
rx call	RIG	total_spots	uniqs	avgSNR	avgK	maxK
HB9CU/3	SDR#/Airsy HF+	7486 (+19%)	514 (+11%)	-17	5388	15847
HB9CU/1	SDR Console/Airsy HF+	7455 (+18%)	517 (+12%)	-17	5353	15847
HB9CU/2	Flexradio 6600/SmartSDR	6313	462	-17	5255	15667
<b>DX Spots &gt; 3000 km (96h)</b>						
rx call	RIG	total_dx_spots	uniqs	avgSNR	avgK	maxK
HB9CU/3	SDR#/Airsy HF+	5217 (+21%)	379 (+11%)	-18	7099	15847
HB9CU/1	SDR Console/Airsy HF+	5155 (+19%)	373 (+9%)	-18	7097	15847
HB9CU/2	Flexradio 6600/SmartSDR	4317	341	-18	7004	15667
<b>DX Spots &gt; 6000 km (96h)</b>						
rx call	RIG	total_dx_spots	uniqs	avgSNR	avgK	maxK
HB9CU/3	SDR#/Airsy HF+	4833 (+22%)	330 (+12%)	-18	7245	15847
HB9CU/1	SDR Console/Airsy HF+	4780 (+21%)	325 (+11%)	-19	7241	15847
HB9CU/2	Flexradio 6600/SmartSDR	3959	293	-18	7171	15667

**Figure 3** — HB9VQQ's comparisons of *WSPR* decodes between an Airspy HF+ connected via an IF tap on a Yaesu FT-450D and another HF+ connected through an SDR switch.



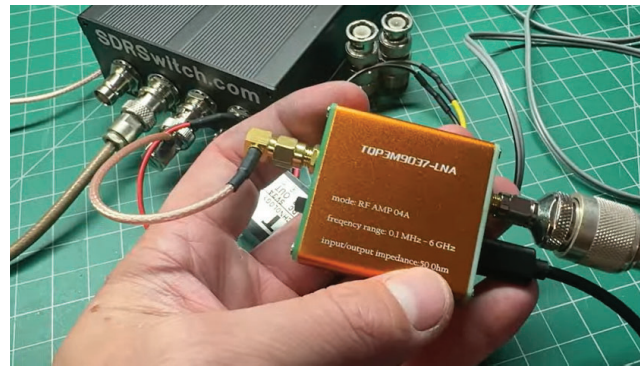
**Figure 4** — Hayden Honeywood's, VK7HH/KD9SSB, SDR setup.

Airspy Mini and the RSP1A (which has since been replaced with the RSP1B).

### Dual-Receive System Setup

There are two main ways to set up a dual-receive system: with an IF tap or with an SDR switch. I'm not a fan of IF taps, because they rely on your radio to process the signal before it gets to the SDR. Additionally, bandwidth can be limited in some setups. My IC-7610 has an IQ output that can be connected to SDR software, but it only supports *HSDR*.

I found a test by HB9VQQ that compares *WSPR* decodes between an Airspy HF+ connected via an IF tap on a Yaesu FT-450D and another HF+ connected through an SDR switch (see Figure 3). The SDR switch provided raw RF signals directly to the SDR, bypassing the radio's internal processing. The results were night and day, with the SDR switch setup showing clear advantages in decoding performance. HB9VQQ also compared the Airspy HF+ to his FLEX-6600, with the Airspy outperforming the FLEX in *WSPR* decodes by 20 percent during a 96-hour period. This highlights the



**Figure 5** — A TQP3M9037-LNA amplifies the signal before it reaches the SDR.



**Figure 6** — A 20 dB attenuator helps ensure the signal isn't overloaded.

effectiveness of using an SDR switch, especially for DXing and weak-signal operating.

### SDR Switch Details

I've been using an SDR switch from [www.sdrswitch.com](http://www.sdrswitch.com). These are not the most affordable options, but they are designed specifically for weak-signal and DX operations. The insertion loss is remarkably low, ranging from 0.035 dB at 3.5 MHz to 0.166 dB at 450 MHz. Isolation figures are also excellent, ensuring that RF from your transceiver doesn't damage your SDR or low-noise amplifier (LNA), which is possibly the most important detail to look for when purchasing an SDR switch.

For comparison, "MFJ-1708SDR and MFJ-1708B-SDR TR Switches," reviewed by Mark Wilson, K1RO, in the March 2019 *QST* Product Review, shows that the MFJ-1708SDR TR switch has a 19.6 dB insertion loss on 70 centimeters. That's like reducing your audio volume from 100 percent to just 1 percent, which explains why some hams find that low-cost SDR switches can make their SDRs "deaf."

## My Setup

Figure 4 shows my setup. My SDR switch is powered by 12 V, connected via a Powerpole connector. The push-to-talk (PTT) port is connected to my IC-7610 via a five-pin DIN cable (this triggers the SDR switch relays when the radio transmits). The LNA is powered by the SDR switch, with a 12 to 5 V adapter providing power through USB.

The antenna signal enters through the SDR switch, passes through the relays, and exits through the RX out port. Before reaching the SDR, the signal is amplified by a TQP3M9037-LNA (see Figure 5), which provides 20 dB of gain and has an extremely low noise figure.

To prevent overloading the SDR, I added a 20 dB attenuator after the LNA (see Figure 6). This ensures the signal is properly balanced. A two-way splitter then directs the signal to the SDR and transceiver. The 3 dB loss from the splitter is negligible due to the LNA's gain.

When transmitting, the SDR switch bypasses the LNA and SDR entirely, protecting them from RF damage.

## In Conclusion

Using an SDR switch with an LNA dramatically improves receive performance without compromising your main transceiver. Paired with software such as *SDR Console*, you can run an SDR side by side with your older transceivers that may lack a waterfall, dramatically increasing your operating experience. While the setup may look complicated, it's straightforward once you break it down. This configuration allows me to monitor the entire 6-meter band and decode multiple signals simultaneously, making it invaluable for DX and weak-signal operations.

Hayden Honeywood, VK7HH/KD9SSB, is an avid experimenter and content creator who's passionate about inspiring, promoting, and educating hams. He's 34 years old and has held an amateur license since 2004. Hayden shares practical projects and tutorials on his YouTube channel Ham Radio DX ([www.youtube.com/HamRadioDX](http://www.youtube.com/HamRadioDX)) with the hope of encouraging hams around the world to have fun with amateur radio.

For updates to this article, see the *QST* Feedback page at [www.arrl.org/feedback](http://www.arrl.org/feedback).



## Field Organization Reports — June 2025

### Public Service Honor Roll

This listing recognizes radio amateurs whose public service performance during the month indicated 70 or more points in six categories. Details on the program can be found at: [www.arrl.org/public-service-honor-roll](http://www.arrl.org/public-service-honor-roll).

435 AC8NP	208 K9SX	145 KC9FXE W9GRG	123 KE5YTA K3JL	100 KA5AZK NX9K	94 KA2HZP	KR4ST W2ITT N1HAN KA8BJA
415 W4DAN	190 N4CNX	W9BGJ W1LEM	120 WA4VGZ WC4FSU	AD4DO KZ8Q	92 NI2W K2PHD	79 K3RC
370 N9VC	189 W2ARP	144 KR4PI KD0HHN	NA7G W2AH KD8UUB	W1KX N1LAH KC1KVY	90 KC9UC KB9GO	78 K3EAM
360 AD8CM	180 N2LC	140 AC0KQ KF5OMH	116 N3GE K8MDA	W1TCD W4EDN K2VTT	W5RFY AB9ZA WA3QPX	77 K1CJV KT5SR
329 W7PAT	175 W9FE	N1JLZ WK4WC N8SY	115 W8IM K1YBO	K2MTG K3YAK KB2QQ WD8SDH	N1CVO KN4AAG W4KX W2QMI W8MAL	76 K6RAU W2ZXN
302 W7EES	171 W5WMC	135 WA3QLW AG9G	110 KM4WHO N1IQI	KB8GUN N8MRS KC8PBU	N8OD K8KRA	75 WB3FTQ AA3N
270 WM5N	170 KA9IKK	W3YVQ	N1RVY	WB8SIQ	89 W4TTO	74 W3ZR
255 WB8YYS	168 KN4QJ	130 WB9EDL K5ANP WB9WKO	106 N2DW KT5EM AD3J	99 KC1HHO	88 W8STN K1STM KC8WH	73 NT1N WJ3P KB2YAA
254 KD2LPM	155 K5OB	W4CMH KY2D KW1U N1UMJ	105 N0JAR NW3X KL7RF	97 N3STP KT4WX	84 KF7GC N0ET	71 KK7FYW
235 W0PZD	154 KO4KUS	125 N1UMJ W2PAX	102 KM4WXX	96 N4NOA	80 KG5AOP KB4OLY KM4BRQ	70 KC2THY
230 KY2MMM	152 KC8T					
220 K7OED	148 KB5PGY					

The following stations qualified for PSHR in May 2025, but have not been recognized in this column yet: KB3YRU 125, WX2DX 90, KA0DBK, WD0BFO 72.

### Section Traffic Manager Reports

The following Section Traffic Managers reported: AR, AZ, CO, CT, DE, EMA, EPA, GA, IA, IL, IN, LA, MDC, ME, MO, NC, NFL, NLI, NM, NNJ, NNY, NTX, OH, OR, RI, SFL, SJV, SNJ, STX, TN, UT, WCF, WI, WMA, WNY, WWA, WY.

### Section Emergency Coordinator Reports

The following Sections submitted ARES Activity Reports for May: CT, EMA, ENY, EPA, GA, IL, IN, MDC, MN, MO, NC, NFL, NNJ, NNY, NTX, NV, OH, SC, STX, TN, VA, WCF, WI, WMA, WPA, WTX.

### Brass Pounders League

The BPL is open to all amateurs in the US, Canada, and US possessions who report to their SMS a total of 500 or more points or a sum of 100 or more origination and delivery points for any calendar month. Messages must be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

KY2D 1,697, NX9K 1,397, W2AH 1,315, KW1U 655, WB9WKO 652, WA3QLW 631, KE5YTA 533, N9CK 514.