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Extreme QRP with a Compromised Antenna for WSJT-X Modes

Mick Schwartz, K7SVW

There is little doubt that K1JT's WSJT-X software has had a profound effect on how Ham Radio Operators have worked the HF bands during the past 5 years.

The ability to make contacts with very low power and modest antennas was an attraction to pursue operating WSJT-X and the FT8/FT4 modes. I wanted to try QRP so I began to look for a radio that would meet its requirements.

I purchased an Elecraft KX3. For me, it had several significant benefits including an internal ATU, great receiver and the ability to scale the transmitter down to 100 mW. I also bought the AX1 mini whip antenna with 40 meter attachment.

I had successfully used the KX3 and AX1 in the WSPR mode for several months. However, I wondered what would happen if I used a simple a wire antenna running around the ceiling of the shack. To make it challenging, I would keep the transmit power level to 1 watt—which is what I had been using for WSPR. Would my underpowered rig and compromised antenna get lost in the noise and the QRM?

I had 26 gauge wire counterpoises for the AX1 as well as the 40 meter extension. Since I had purchased a Binding post connector for wire antennas, I ran the 33 foot- 40 meter counterpoise around the ceiling and over the window shade and connected it to the antenna side of the connector. I next took the 13 foot counterpoise for the AX1 and ran it under some picture frames and connected it to the ground side.

I had heard about the amazing ability of the KX3 Antenna Tuner and I was not disappointed. On 20 meters, I could get the antenna to an SWR of 1:1. On 30M it was 1.1:1. Same for 17 meters, 15, 12 and 10. I tried 80 meters thinking there was no way the ATU could match this kluge antenna. Wrong again. I got





1.2: 1! Knowing that the KX3 could match this crazy antenna system, I set out to make some QSOs! I thought with this kind of antenna, indoors and running 1 Watt, it would be a very short experiment.

I was about ready to give up after several days of nobody returning my calls. Then I one evening, I answered a CQ from K6ESE on 40M FT8. I got a response from him and seeing his reply with my call sign and signal report in the WSJT-X software, I almost couldn't believe it. I had finally made a QSO!

I wondered if I made one QSO, could I make another? It turned out I could as each day I worked a few more stations. However, the big test for me was—could I work DX? I was looking toward Europe. One day I was startled to see OQ4U in Belgium respond to my call on FT4. This time my jaw dropped as I watched signal reports being exchanged. A valid QSO almost 5,000 miles away!

Now could I do it again? I made a QSO on FT4 several days later with EB2AM in Spain. I had proved to myself that it was possible to make QSOs long haul with Extreme QRP and a Compromised antenna!

As of January 2022, I have made 546 QSOs on FT4/8 and 2 on 20 meter cw. They include 44 states, 11 countries and 3 Continents as well as SWL reports from the US, Italy and Russia.

Extreme QRP with a Compromised Antenna is definitely not for the faint of heart. But for those who like a good challenge, there is nothing more gratifying to see stations answering your call sign—especially those thousands of miles away.

Time	Loc	Call	Mode	Power	Country	Continent	QSO
2021-03-22 10:12	USA	K6ESE	FT8	1.0W	United States	NA	1
2021-03-22 10:13	USA	K6ESE	FT8	1.0W	United States	NA	2
2021-03-22 10:14	USA	K6ESE	FT8	1.0W	United States	NA	3
2021-03-22 10:15	USA	K6ESE	FT8	1.0W	United States	NA	4
2021-03-22 10:16	USA	K6ESE	FT8	1.0W	United States	NA	5
2021-03-22 10:17	USA	K6ESE	FT8	1.0W	United States	NA	6
2021-03-22 10:18	USA	K6ESE	FT8	1.0W	United States	NA	7
2021-03-22 10:19	USA	K6ESE	FT8	1.0W	United States	NA	8
2021-03-22 10:20	USA	K6ESE	FT8	1.0W	United States	NA	9
2021-03-22 10:21	USA	K6ESE	FT8	1.0W	United States	NA	10
2021-03-22 10:22	USA	K6ESE	FT8	1.0W	United States	NA	11
2021-03-22 10:23	USA	K6ESE	FT8	1.0W	United States	NA	12
2021-03-22 10:24	USA	K6ESE	FT8	1.0W	United States	NA	13
2021-03-22 10:25	USA	K6ESE	FT8	1.0W	United States	NA	14
2021-03-22 10:26	USA	K6ESE	FT8	1.0W	United States	NA	15
2021-03-22 10:27	USA	K6ESE	FT8	1.0W	United States	NA	16
2021-03-22 10:28	USA	K6ESE	FT8	1.0W	United States	NA	17
2021-03-22 10:29	USA	K6ESE	FT8	1.0W	United States	NA	18
2021-03-22 10:30	USA	K6ESE	FT8	1.0W	United States	NA	19
2021-03-22 10:31	USA	K6ESE	FT8	1.0W	United States	NA	20
2021-03-22 10:32	USA	K6ESE	FT8	1.0W	United States	NA	21
2021-03-22 10:33	USA	K6ESE	FT8	1.0W	United States	NA	22
2021-03-22 10:34	USA	K6ESE	FT8	1.0W	United States	NA	23
2021-03-22 10:35	USA	K6ESE	FT8	1.0W	United States	NA	24
2021-03-22 10:36	USA	K6ESE	FT8	1.0W	United States	NA	25
2021-03-22 10:37	USA	K6ESE	FT8	1.0W	United States	NA	26
2021-03-22 10:38	USA	K6ESE	FT8	1.0W	United States	NA	27
2021-03-22 10:39	USA	K6ESE	FT8	1.0W	United States	NA	28
2021-03-22 10:40	USA	K6ESE	FT8	1.0W	United States	NA	29
2021-03-22 10:41	USA	K6ESE	FT8	1.0W	United States	NA	30
2021-03-22 10:42	USA	K6ESE	FT8	1.0W	United States	NA	31
2021-03-22 10:43	USA	K6ESE	FT8	1.0W	United States	NA	32
2021-03-22 10:44	USA	K6ESE	FT8	1.0W	United States	NA	33
2021-03-22 10:45	USA	K6ESE	FT8	1.0W	United States	NA	34
2021-03-22 10:46	USA	K6ESE	FT8	1.0W	United States	NA	35
2021-03-22 10:47	USA	K6ESE	FT8	1.0W	United States	NA	36
2021-03-22 10:48	USA	K6ESE	FT8	1.0W	United States	NA	37
2021-03-22 10:49	USA	K6ESE	FT8	1.0W	United States	NA	38
2021-03-22 10:50	USA	K6ESE	FT8	1.0W	United States	NA	39
2021-03-22 10:51	USA	K6ESE	FT8	1.0W	United States	NA	40
2021-03-22 10:52	USA	K6ESE	FT8	1.0W	United States	NA	41
2021-03-22 10:53	USA	K6ESE	FT8	1.0W	United States	NA	42
2021-03-22 10:54	USA	K6ESE	FT8	1.0W	United States	NA	43
2021-03-22 10:55	USA	K6ESE	FT8	1.0W	United States	NA	44
2021-03-22 10:56	USA	K6ESE	FT8	1.0W	United States	NA	45
2021-03-22 10:57	USA	K6ESE	FT8	1.0W	United States	NA	46
2021-03-22 10:58	USA	K6ESE	FT8	1.0W	United States	NA	47
2021-03-22 10:59	USA	K6ESE	FT8	1.0W	United States	NA	48
2021-03-22 11:00	USA	K6ESE	FT8	1.0W	United States	NA	49
2021-03-22 11:01	USA	K6ESE	FT8	1.0W	United States	NA	50
2021-03-22 11:02	USA	K6ESE	FT8	1.0W	United States	NA	51
2021-03-22 11:03	USA	K6ESE	FT8	1.0W	United States	NA	52
2021-03-22 11:04	USA	K6ESE	FT8	1.0W	United States	NA	53
2021-03-22 11:05	USA	K6ESE	FT8	1.0W	United States	NA	54
2021-03-22 11:06	USA	K6ESE	FT8	1.0W	United States	NA	55
2021-03-22 11:07	USA	K6ESE	FT8	1.0W	United States	NA	56
2021-03-22 11:08	USA	K6ESE	FT8	1.0W	United States	NA	57
2021-03-22 11:09	USA	K6ESE	FT8	1.0W	United States	NA	58
2021-03-22 11:10	USA	K6ESE	FT8	1.0W	United States	NA	59
2021-03-22 11:11	USA	K6ESE	FT8	1.0W	United States	NA	60
2021-03-22 11:12	USA	K6ESE	FT8	1.0W	United States	NA	61
2021-03-22 11:13	USA	K6ESE	FT8	1.0W	United States	NA	62
2021-03-22 11:14	USA	K6ESE	FT8	1.0W	United States	NA	63
2021-03-22 11:15	USA	K6ESE	FT8	1.0W	United States	NA	64
2021-03-22 11:16	USA	K6ESE	FT8	1.0W	United States	NA	65
2021-03-22 11:17	USA	K6ESE	FT8	1.0W	United States	NA	66
2021-03-22 11:18	USA	K6ESE	FT8	1.0W	United States	NA	67
2021-03-22 11:19	USA	K6ESE	FT8	1.0W	United States	NA	68
2021-03-22 11:20	USA	K6ESE	FT8	1.0W	United States	NA	69
2021-03-22 11:21	USA	K6ESE	FT8	1.0W	United States	NA	70
2021-03-22 11:22	USA	K6ESE	FT8	1.0W	United States	NA	71
2021-03-22 11:23	USA	K6ESE	FT8	1.0W	United States	NA	72
2021-03-22 11:24	USA	K6ESE	FT8	1.0W	United States	NA	73
2021-03-22 11:25	USA	K6ESE	FT8	1.0W	United States	NA	74
2021-03-22 11:26	USA	K6ESE	FT8	1.0W	United States	NA	75
2021-03-22 11:27	USA	K6ESE	FT8	1.0W	United States	NA	76
2021-03-22 11:28	USA	K6ESE	FT8	1.0W	United States	NA	77
2021-03-22 11:29	USA	K6ESE	FT8	1.0W	United States	NA	78
2021-03-22 11:30	USA	K6ESE	FT8	1.0W	United States	NA	79
2021-03-22 11:31	USA	K6ESE	FT8	1.0W	United States	NA	80
2021-03-22 11:32	USA	K6ESE	FT8	1.0W	United States	NA	81
2021-03-22 11:33	USA	K6ESE	FT8	1.0W	United States	NA	82
2021-03-22 11:34	USA	K6ESE	FT8	1.0W	United States	NA	83
2021-03-22 11:35	USA	K6ESE	FT8	1.0W	United States	NA	84
2021-03-22 11:36	USA	K6ESE	FT8	1.0W	United States	NA	85
2021-03-22 11:37	USA	K6ESE	FT8	1.0W	United States	NA	86
2021-03-22 11:38	USA	K6ESE	FT8	1.0W	United States	NA	87
2021-03-22 11:39	USA	K6ESE	FT8	1.0W	United States	NA	88
2021-03-22 11:40	USA	K6ESE	FT8	1.0W	United States	NA	89
2021-03-22 11:41	USA	K6ESE	FT8	1.0W	United States	NA	90
2021-03-22 11:42	USA	K6ESE	FT8	1.0W	United States	NA	91
2021-03-22 11:43	USA	K6ESE	FT8	1.0W	United States	NA	92
2021-03-22 11:44	USA	K6ESE	FT8	1.0W	United States	NA	93
2021-03-22 11:45	USA	K6ESE	FT8	1.0W	United States	NA	94
2021-03-22 11:46	USA	K6ESE	FT8	1.0W	United States	NA	95
2021-03-22 11:47	USA	K6ESE	FT8	1.0W	United States	NA	96
2021-03-22 11:48	USA	K6ESE	FT8	1.0W	United States	NA	97
2021-03-22 11:49	USA	K6ESE	FT8	1.0W	United States	NA	98
2021-03-22 11:50	USA	K6ESE	FT8	1.0W	United States	NA	99
2021-03-22 11:51	USA	K6ESE	FT8	1.0W	United States	NA	100

Click chart to enlarge

News & Updates

2023 Conventions

- Feb 10-12 - HamCation 2023, Orlando, FL
- Apr 21-23 - IDXC, Visalia, CA
- May 19-21 - Hamvention 2023, Xenia, OH
- June 2-4 - SEA-PAC, Seaside, OR

Price Changes Coming January 2023

While manufacturing worldwide continues to be affected by the material shortages, our purchasing team is doing a great job sourcing materials, but at a cost. We continue to face price increases of raw material, parts, and transportation costs. As a result, we will be increasing prices of products across all product lines in January 2023. Any orders before this price increase will be honored at the lower prices.

We value your business and thank you for your patience as we continue to navigate these challenging times.

New KX2 & KX3 T-Shirts

Wondering what to give to that special someone? Check out our new KX-Line T-Shirts. Perfect for the KX2 or KX3 owner...or soon to be owner!



Did you know we have Clearance and Open Box Items?



If you haven't checked out our [Clearance Products](#) page, you may be missing deals on items that you've always wanted! You'll find clearance items, open box items that were returned but not used and refurbished items. Radios, amplifiers, antenna tuners, and panadapters come with our standard one year warranty.

K3/K3S Options Update

It's Been a Challenging Year...

We have been navigating a wide range of parts and manufacturing issues this year. The K3 Options suffered as we first had to keep our primary product lines rolling out the door to you. (K4s, KX-Line, Amps 100, 500 and 1500W, etc.) Our purchasing team has been successful in sourcing parts for these primary products and keeping them shipping, but it's taken way more focus and effort than anyone expected.

We have also had to contend with one of our key circuit board assembly subcontractors becoming unavailable after being sold to another company. That resulted in our other assembly subcontractors becoming overloaded. All of our boards are built in the U.S. Fortunately, we have now qualified and brought online several new U.S. circuit board assembly companies with excellent results. In addition to smoothing our regular production, this has made it possible to get our focus back on the K3 Options.

Starting with the current K3 & K3S option status

As long as there aren't any new parts issues or surprise manufacturing delays, the items listed below should ship close to the date ranges listed below. These boards are now in process.

P3TXMON 6-8 weeks

K3EXREF 8 weeks

KAT3A 8 weeks

KDVR3 8 weeks

KPA3A 6-8 weeks

KIO3B 8-9 weeks

KSYN3A 8 weeks

KBPF3A 8 weeks

KXV3B 6-8 weeks

K144XV and K144RFLK 7-10 days

We've completed building an additional batch of K144XV 2M options, and we're finishing up the matching K144RFLK lock boards, which lock the K144XV's frequency to the K3's reference oscillator. We'll be contacting customers who ordered these two items to confirm shipping information and to collect payment for shipping. We will also send payment links to customers who place half deposits for final payment.

Remaining 3 Last Time Buy Items

P3: We are still experiencing long parts delays from Analog devices and Microchip.

P3SVGA: We are experiencing long parts delays from AMD (Xilinx FPGA) and Microchip (uC).

K3/0 Mini: There are still microchip (uC) delays, plus qualifying second sources on several other parts. We are also evaluating our demo stock of K3/0 Minis to see if that can help with regular orders or our wait-list orders.

We will update everyone on these last three items as we get new information.

How we will notify you when your order is ready to ship

We will contact you by email as soon as your order is ready to ship. When we take delivery of materials, we will also list the shipping status of the item/items on the shipping status page located on our website. For those of you who have ordered multiple K3/K3S options, each item will be delivered as soon as the item is assembled.

Wait List

K3/K3S Options Wait List is still open. Email sales@elecraft.com to place your Wait List order. While we can't guarantee to fulfill wait list orders, we will do our best. High-demand K3/K3S options may have a second run depending on material availability and cost. Once orders have been fulfilled and we have surplus K3/K3S options, we will contact those who are on the wait list by wait list order date. Out-of-stock items will be listed on the Shipping Status page.

How to cancel your order/request a refund

If you would like to cancel your order, we will refund your deposit immediately. To request a refund, please email sales@elecraft.com and provide your first and last name, call sign, and your order number if you have it.

If we have K3/K3S options available after we've shipped the pre-orders and wait list orders, we will place those items on the website for purchase.

Elecraft K4 Compression with CESSB

By Rick Miller, N1RM

Introduction

[This is a brief version of a longer article that appeared in the June issue of the PVRC Newsletter. The complete article can be found at https://pvrc.org/Newsletters/2022_06.pdf]

Single sideband is a very efficient way of modulating RF with audio. All the RF power coming out of the transmitter directly contributes to the reproduction of the audio signal in the receiver with no watts wasted in a carrier or redundant sideband.

The average power of the human voice, compared to its peak, is low – often several dB below peak power. Your 100-watt peak transmitter may only put out a few watts of average power when operating SSB voice.

Speech compression increases the level of quieter parts of speech so that the average power is greater and more easily heard. It is a simple concept, but it can be difficult to implement without the output signal becoming distorted or growing in bandwidth ("splattering").

Starting in beta release 29/30 of the K4 firmware, Elecraft included Controlled Envelope Single Sideband (CESSB) processing in their speech compression. CESSB, introduced by Dave Hershberger, W9GR, in 2014, *Controlled Envelope Single Sideband*, QEX – November/December 2014, http://www.arrl.org/files/file/QEX_Next_Issue/2014/Nov-Dec_2014/Hershberger_QEX_11_14.pdf

incorporates some clever signal processing to permit significant compression without excessive distortion. In his article, Dave stated that an increase in average power of up to 4 dB is possible with this approach.

Measurements

Test Setup

The test signal was a 4 second audio clip calling CQ, recorded on a computer using Audacity software. The audio output from the computer was fed to the analog line input on the K4D. The line input level was set for full output power with minimal ALC action to isolate the CESSB processing from ALC. Noise gate and ESSB were both off, the Tx Equalizer was flat, and the Tx Bandwidth was set to 2.8 kHz. The 100 watt peak RF signal was taken directly from the K4D antenna output, attenuate and fed to a digital oscilloscope and a spectrum analyzer.

RF Waveform Comparison

Figure 1 shows the effects of CESSB on the output RF envelope in the time domain for compression settings from zero (off) to 30 (maximum). These waveforms show the dramatic effects of K4 compression.



Figure 1 - CESSB effects on RF Envelope

Peak and Average Power Measurements

With the peak output of the K4D set to 100 watts (50 dBm), 800 instantaneous power measurements were taken during the test transmission of the audio clip and those samples were averaged. The results in Table 1 show that at maximum compression, the K4D CESSB implementation achieves the 4 dB average power improvement predicted in the original QEX article.

Table 1 - Average power measurements

CESSB Compression Performance					
Compression Setting	0	1	10	20	30
Average Power (dBm)	43.5	44.9	46.3	47.1	47.5
Increase (dB)	0.0	1.4	2.8	3.6	4.0

Spectral Behavior

Very high compression levels aren't much good if they cause the signal to distort and "splatter" outside its normal bandwidth. While it's clear that the K4 CESSB compression is effective at increasing average power, it was also important to see how well it constrains the signal's bandwidth. Figure 2 shows spectrum measurements taken using the voice test clip. There was no measurable increase in occupied bandwidth when the compression level was changed from 0 to 30.

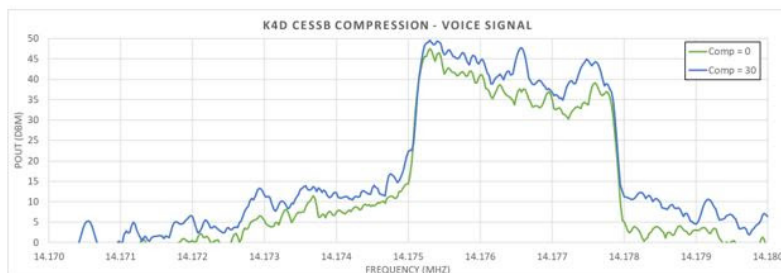


Figure 2 – CESSB Compression does not increase occupied bandwidth

So, how does it sound?

The time domain waveforms of the compressed signal make it look like the RF is clipped, which would create lots of splatter. The spectrum plot of the signals, though, shows no widening of the signal bandwidth even at the highest compression levels. It looks like Elecraft's implementation of CESSB is very good.

I used R29 in the WPX SSB contest with the compression level set at 20. I received more than the usual number of unsolicited "loud" comments, and also more than the usual number "great audio" comments.

I listened to the signal on the radio's monitor, which includes the compression processing. I found that up to a setting of around 20, the signal got much more punch with no significant effects on audio quality (to my ear). Full compression at a setting of 30 seems to be right at the onset of perceptible distortion. Of course, all these observations are purely subjective.

Bottom Line

In my opinion, the speech compression processing introduced in Beta release R29 is extremely effective. It made my station louder without degrading audio quality and without increasing my transmitted bandwidth.

¹ *Controlled Envelope Single Sideband*, QEX – November/December 2014, http://www.arrl.org/files/file/QEX_Next_Issue/2014/Nov-Dec_2014/Hershberger_QEX_11_14.pdf

² *Occupied Bandwidth* (OBW) is defined as the bandwidth containing 99% of the total integrated power of the transmitted spectrum.

HELVETIA Contest 2022 Winner – HB9NBG QRV in the SOAB-SSB-HP Category



The HELVETIA Contest is THE competitive event for Swiss HF radio amateurs in the annual calendar. During the 24-hour contest, the aim is to "work" on as many HF bands in as many cantons as possible and to establish as many radio connections as possible with radio amateurs in Switzerland and abroad. René, HB9NBG took part again this year in the SOAB-SSB-HP category (single operator in SSB with power up to 1kW). Carine was responsible for providing food and drink, and to motivate the contest participants :-)

The following setup was used:

- ELECRAFT K4D Transceiver
- Microphone HEIL PR-781 High-performance transistor KW output stage
- EXPERT 1.3K-FA with ATU Antenna for 20/15/10m MOSLEY MP-33
- NW Antenna for 80 and 160m G5RV from HARI
- Homemade end fed for 160m with QRO-UNUN from PALOMAR

UNION SCHWEIZERISCHER KURZWELLEN-AMATEURE

UNION DES AMATEURS SUISSES D'ONDES COURTES

UNIONE RADIOAMATORI DI ONDE CORTE SVIZZERI

UNION OF SWISS SHORT WAVE AMATEURS

Member of the International Amateur Radio Union

			160m				80m				40m				20m				15m				10m				Sum				Total
Place	Call	Canton	QSO	Points	DXCC	Canton	QSO	Points	DXCC	Canton	QSO	Points	DXCC	Canton	QSO	Points	DXCC	Canton	QSO	Points	DXCC	Canton	QSO	Points	DXCC	Canton	QSO	Points	DXCC	Canton	
1	HB9NBG	SO	42	330	7	17	213	1'302	23	26	240	1'115	16	24	199	622	36	17	80	393	25	19	28	218	8	11	802	3'980	115	114	911'426
2	HB9CZ	TI	41	248	9	14	124	682	22	22	326	1'144	35	24	162	521	39	15	90	362	16	8	3	23	2	1	746	2'980	123	84	616'860
3	HB9GHJ	GR	0	0	0	0	138	869	15	23	262	1'297	20	25	97	213	37	9	10	50	6	4	13	44	10	1	520	2'473	88	62	370'950
4	HB9CEJ	ZH	5	50	1	5	146	866	19	23	198	839	19	22	58	186	21	8	38	229	10	13	14	133	2	9	459	2'303	72	80	350'056
5	HB9BOI	VD	0	0	0	0	94	571	15	20	200	965	22	23	54	177	19	8	18	57	10	3	35	241	8	10	401	2'011	74	64	277'518
6	HB9OAR	TI	17	125	4	10	57	354	13	16	164	740	20	20	89	156	31	4	19	61	10	4	2	13	2	1	348	1'449	80	55	195'615
7	HB9DVH	VS	13	112	3	9	56	452	7	22	111	606	13	17	53	194	21	12	19	82	7	4	4	19	3	1	256	1'465	54	65	174'335
8	HB9HVE	BE	0	0	0	0	29	162	10	11	240	1'115	24	24	19	19	10	0	7	18	6	1	6	60	1	5	301	1'394	51	41	129'248
9	HB9EFJ	TI	0	0	0	0	27	252	2	15	190	1'045	13	23	28	111	16	4	0	0	0	0	0	0	0	0	245	1'408	31	42	102'784
10	HB9TGF	TI	0	0	0	0	28	154	9	10	116	575	15	22	43	101	22	1	7	27	4	1	3	23	2	1	197	880	52	35	76'560
11	HB9ZCF	ZH	3	30	1	3	34	268	6	20	39	228	9	17	21	59	15	3	13	100	4	8	12	92	3	7	122	777	38	58	74'592
12	HB9OAU	TI	0	0	0	0	0	0	0	0	78	501	9	18	23	63	14	1	0	0	0	0	0	0	0	0	101	564	23	19	23'688
13	HB9HIO	TI	0	0	0	0	6	60	1	6	51	357	8	18	10	64	5	3	2	20	1	2	0	0	0	0	69	501	15	29	22'044
14	HB9HGW	LU	0	0	0	0	0	0	0	0	7	61	2	6	1	1	1	0	0	0	0	0	0	0	0	0	8	62	3	6	558

"In continuous operation over 24 hours (single operators are allowed to be active for 18 hours), the equipment is under maximum stress and every technical problem immediately costs valuable points. For me (René, HB9NBG) this year's HELVETIA contest was THE opportunity to present the new K4D from ELECRAFT to test under the most extreme conditions with "packed" bands, in which stations with powerful signals have lined up without gaps - My conclusion: The K4 shines with excellent large signal strength and selectivity. Thanks to the convenient operation via the touchscreen and the wireless mouse, band and frequency changes were carried out in a flash, and thanks to the clear visualization in the spectrum and waterfall, which is second to none, finding even the weakest signal was child's play, even in the late hours. The new "CESSB" gives the K4 a powerful and penetrating modulation quality, and the integrated 8-band TX equalizer allows the transmit audio to be adjusted to be really DZ-compatible and still very balanced." René, HB9NBG (Lutz-Electronics)



K4 Update

High-Performance Direct Sampling SDR



Check out K4 features on our [YouTube Channel](#)



K4 Shipping Update (As of 12/13/2022)

Now Emailing for shipping confirmation Group 3 orders:

- K4D Group 3 orders emailed through 10/11/22
- K4 Group 3 orders emailed through 8/6/22

You can see K4 shipping status update on our [Shipping Status page](#).

How You Will Be Notified When Your K4 is Ready to Ship

A member of the Elecraft Sales Team will contact you by email when your K4 is ready to ship. They will verify your shipping address and provide you with any additional information regarding your order.

If your email address has changed, please complete the [New Email Address Form here](#).

KAT4 Option

K4 owners can now upgrade their K4 with the KAT4 Auto-Tuner option. [Learn more here](#).

K4 Documentation

If you're interested in the capabilities of the K4 transceiver, you might want to take a look at two user documents that are now available for download. Visit our [Manuals](#) page and select the K4 section.

- [Introduction to the Elecraft K4](#)
- [K4 Operating Manual](#)

Additional documentation will be released soon, including the K4 Owner's Manual and the K4 Programmer's Reference.

Learn more about the K4 and order [here](#).

Listen for us on the air - We'll likely be on a K4!