

# KSYN3A FAQ

Rev C.2, February 13, 2015

## Technical and Configuration Details

### 1. What is involved in upgrading from the KSYN3 to the KSYN3A?

- a. The KSYN3A plugs into the same connectors as the KSYN3s for the main and sub synthesizers. There are minor differences in cable routing that are covered in the accompanying installation instructions. No user calibration is required for the KSYN3A, simplifying the installation process. Version 5.10 or later K3 firmware is required (presently available on our web site as a beta release).

### 2. Will the new synthesizer module be included in future orders of the KRX3 sub receiver?

- a. Yes. But we also have limited quantities of the original synthesizer boards for those with existing K3s who wish to add a KRX3 but not upgrade the synth. Questions on specific orders should go to [sales@elecraft.com](mailto:sales@elecraft.com).

### 3. What is the approximate 2-kHz dynamic range (IMDDR3) of the K3 when using the new synthesizer?

- a. Our tests show in excess of 105 dB with the narrowest filters, though there are many factors, and this should be considered approximate. (A very robust test setup is required to make these measurements.) Rob Sherwood, NC0B, tested a K3 with a KSYN3A and obtained the following results:

2-kHz IMDDR3 with 200-Hz roofing and DSP filter = 107 dB

2-kHz IMDDR3 with 400-Hz roofing and DSP filter = 104 dB

See <http://www.sherweng.com/table.html>.

### 4. How much lower is the KSYN3A's phase noise than that of the original KSYN3? How does this affect signals?

- a. At an offset of 2 kHz, the KSYN3A's phase noise is typically 15 to 20 dB lower on a given band. Generally speaking, this means a smaller increase in the noise floor in receive mode in the presence of very strong close-in signals. The limiting factor would then be how clean everyone else's signals are. Your own transmit signal will be cleaner when using the KSYN3A, though the K3 already has one of the cleanest transmitters available, accounting for its popularity with DXpeditions and multi-transmitter contest stations.

### 5. What is the K3's 100-490 kHz receive sensitivity? What signals would I find in this range?

- a. With preamp OFF, we measured about -125 dBm at 475 kHz and -90 dBm at 250 kHz. We have not measured MDS below 250 kHz, but the receiver will gradually become less

sensitive as you go lower in frequency due to band-pass filter roll off (in the KBPF3, which is required for operation below 160 meters). These tests were made with the signal routed through the RX ANT IN or XVTR IN jacks on the KXV3 option module. The preamp is not effective in this range and must be turned off. A sub receiver (KRX3) fitted with a KBPF3 should have similar performance, whether the signal is obtained from the main path (KXV3) or from the sub's AUX RF input.

- b. As for signals: there's the 600-meter band (more on that below), a large number of commercial CW beacons (for example, see [www.dxinfocentre.com/ndb.htm](http://www.dxinfocentre.com/ndb.htm)), and other interesting phenomena. We've just begun to explore it ourselves!

#### **6. Will I notice any change in performance if I upgrade to the KSYN3A?**

- a. First there's the obvious -- the ability to tune the VFOs much lower in frequency. If you're a high-speed CW operator, you should be able to hear an improvement in CW element timing at high code speeds, as well as somewhat faster receive recovery. The dynamic range of the K3 was already excellent, and its phase noise very low, so you might notice the additional improvement in these parameters only in very difficult signal conditions.

#### **7. How does the new synth affect CW operation?**

- a. The KSYN3A switches faster than the KSYN3, which allows us to more precisely control CW timing. This means less "jitter" (timing variation) at high CW speeds. Many CW operators who had been using "QRQ" mode (CONFIG: CW QRQ=ON) for CW in the 35-60 WPM range will now be able to use normal CW mode (CW QRQ=OFF), meaning they no longer give up RIT and SPLIT when using fast CW. Receive recover times also improve. Note that we recently introduced a variation on CW break-in signal processing called "NEW QSK" (selected by tapping '3' in the CW WGHT menu entry). This eliminates audio T/R artifacts heard with the original algorithm ("OLD QSK"), at the expense of some slowing of receive recovery (by purging the DSP's "pipeline"). Installing a KSYN3A speeds up receive recovery for both the OLD and NEW QSK settings.

#### **8. What is required to use the 600-meter band?**

- a. This band is available in some countries, often on an experimental basis. Specific restrictions may apply. A K3 fitted with a KSYN3A, as well as a KXV3 and KBPF3, can receive signals on this band, and can put out about 1 milliwatt of transmit power. An external amplifier will be needed, connected to the XVTR OUT jack. At present we don't have information on such amplifiers. You can also get on this band using an upconversion transverter whose output is on a low HF band (also not presently supplied by Elecraft). For a general introduction to the 600-meter band, see: [http://en.wikipedia.org/wiki/600-meter\\_amateur\\_radio\\_band](http://en.wikipedia.org/wiki/600-meter_amateur_radio_band)

#### **9. Can a transverter I.F. of "0" be defined as an alternative to setting CONFIG:KXV3 to TEST?**

- a. Not at this time, though we hope to add this capability. Those who frequently alternate between TEST and NOR modes can assign the KXV3 menu entry to a programmable

function switch, or write a switch macro to change this menu setting as well as set up the VFO, preamp, etc., for this band.

**10. When used with the KRX3A, does diversity mode operate the same with the new synthesizers?**

- a. Yes. In diversity mode, as long as the main and sub crystal filter offsets are matched, both receivers are driven by the main synth (the sub synth is not used in this case). When the VFO is moved, the local oscillator phase relationship remains stable between the main and sub receivers. With the original synths, moving the VFO even a small amount causes both the main and sub synths to be updated. Since they use separate LC oscillators, the phase relationship will change. The two will remain phase-locked to the reference, but the absolute value of the phase between the two synths will be some value between 0 and 180 degrees.

## What is a KSYN3A and what do I need to order?

### 1. What is the KSYN3A board and what is it used for?

- a. It is included in every K3. It is used to generate and control the K3's VFO frequency. It is the Variable Frequency Oscillator (VFO) for the radio.

### 2. Do I have one or more of them in my K3?

- a. Any K3 will have at least one KSYN3 board installed.
- b. If you have the 2<sup>nd</sup> Receiver option installed (KRX3 option), you will have a second KSYN3 installed.

### 3. Why did Elecraft produce the KSYN3A?

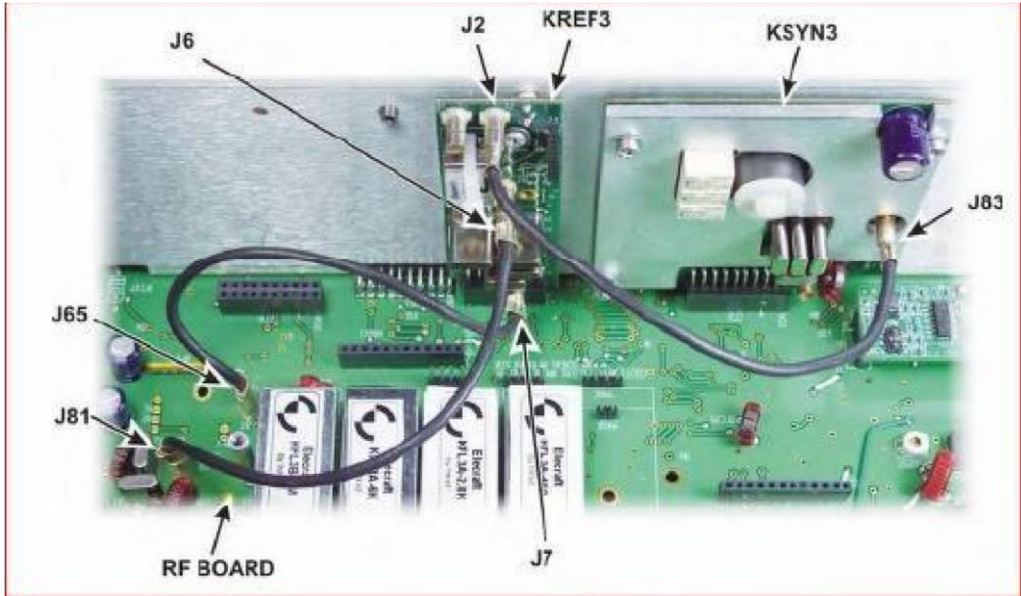
- a. While we were conducting a redesign of the KSYN3, we discovered there were ways to improve performance of the K3. The redesigned board is now called the KSYN3A.

### 4. What do these performance improvements mean?

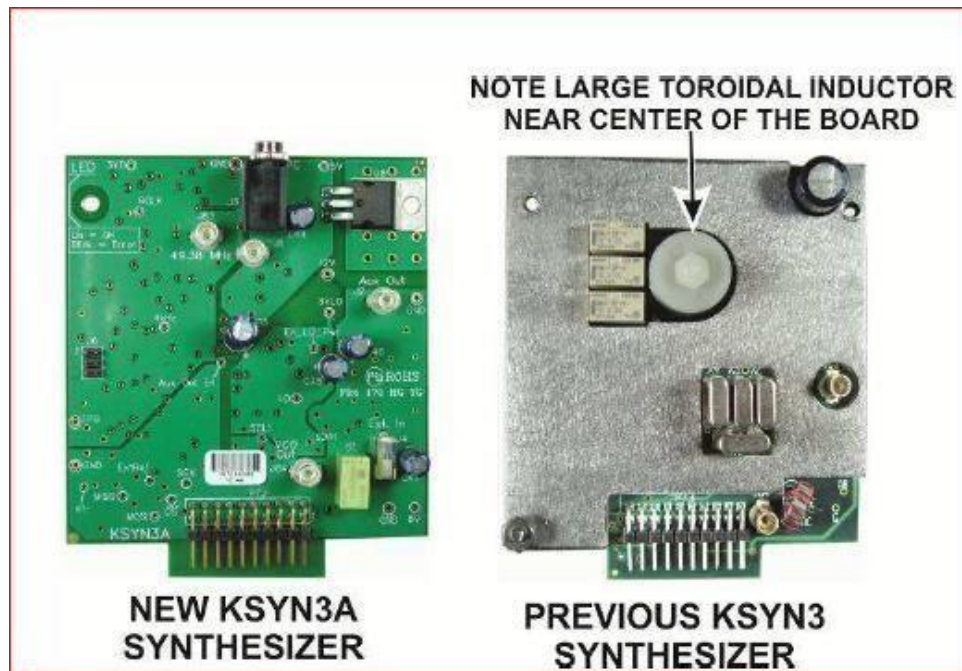
- a. Our tests showed there are significant phase noise improvements to our already excellent phase noise specifications. This means the K3 will be able to better separate stations when they are very close together, such as in a pile-up or a contest.
- b. The KSYN3A switches frequencies very quickly, reducing CW timing variations at faster code speeds. (Those who are presently using "QRQ mode" to reduce such variations may no longer need to do so.)
- c. The KSYN3A is highly resistant to physical vibration and magnetic fields.

### 5. How can I determine if I have the KSYN3 or KSYN3A board?

- a. You can inspect the K3 by removing the top cover.
- b. Mounted vertically, you will see 1 or 2 KSYN3 boards mounted to the metal plate just behind the front panel. The picture below shows one KSYN3. The second KSYN3 would be located to the left of the KREF3 board.



- c. The original KSYN3 board will have a metal plate mounted as shown in the picture above.
- d. The new KSYN3A will not have a metal plate, and it has different components as is evident from the picture below.



**6. I see a connector at the upper edge of the KSYN3A. What is this for?**

- a. Unlike the original KSYN3, the KSYN3A contains a programmable controller. This allows Elecraft to periodically update KSYN3A firmware even in the field. Similar to the K144XV and other add-on accessories, Elecraft does not expect it to be updated often.

**7. Is the KSYN3A an option when I purchase a K3?**

a. No. It is shipped with any K3 purchased.

**8. If I have an older KSYN3 board, do I need to upgrade it right now?**

a. No. The original KSYN3 boards remain fully supported by Elecraft.

**9. If I have the original KSYN3 board(s) and want to upgrade them, is there an upgrade I can purchase?**

a. Please order KSYN3A Upgrade Kit, KSYN3AUPG.

**10. When did Elecraft start shipping KSYN3A boards with K3's?**

a. Here's how to tell which KSYN3 board you have.

<b>I have K3 serial number 8800 or below</b>	<b>I have K3 serial number 8801 or above</b>
Your K3 has the KSYN3 board installed.	Your K3 has the KSYN3A board installed.

**11. Does the KRX3 also have a KSYN3 when it ships as an option?**

a. Yes, a second KSYN3 board will be seen in the K3 when the KRX3 option is present in the K3.

**12. Can the K3 have an old K3SYN and a KRX3 a new K3SYN?**

a. No - KSYN3 and a KSYN3A boards cannot be mixed. They must match.

**13. I want to order the KRX3, 2<sup>nd</sup> Receiver for my K3. What do I need to order? a.**

Here's what you will need:

I want to:	I have K3 serial number less than 8800	I have K3 serial number greater than 8801
<b>Add a 2<sup>nd</sup> Receiver to my K3</b>	Order product KRX3A, 2 <sup>nd</sup> Receiver ** plus **  Order KSYN3A Upgrade Kit, KSYN3AUPG  Upgrade to K3 firmware version 5.08 or higher	Order product KRX3A, 2 <sup>nd</sup> Receiver  ** Do Not order KSYN3A upgrade kit **

<b>Change my KSYN3 boards to KSYN3A boards</b>	Upgrade to K3 firmware version 5.08 or higher  Purchase the KSYN3A Upgrade Kit	No action is required.  You already have the KSYN3A board installed.
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\*\*\*\* End of FAQ \*\*\*\*