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KPA1500: Frequently Asked Questions

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KPA1500 General Questions

Q: What is the KPA1500?

A: The KPA1500 is our 1500 Watt PEP output, MF, HF and 6 Meter linear amplifier. It utilizes the latest LDMOS transistor technology to provide a robust desktop amplifier in a compact cabinet, with an included companion power supply that can be located off your desktop.

The KPA1500 was designed with the serious operator in mind. Its no-nonsense front panel shows all important parameters at a glance, with a high-contrast 32-character LCD and fast, bright LED bar graphs. Band switching is instantaneous, via control inputs or RF sensing. Protection and monitoring circuitry is extensive and foolproof, letting you focus on the job at hand — breaking pileups and overcoming the most difficult operating conditions. And it wouldn't be an Elecraft amp without robust PIN-diode T/R switching. Like our KPA500, the KPA1500 offers fast QSK without a noisy relay.

The amplifier's rugged internal ATU can handle full power with load SWR at least 3:1, while a wider matching range is allowed at lower power levels, including up to 10:1 in standby mode.

Q: What is the pricing for the KPA1500?

A: Introductory pricing is $5,995 U.S. This includes the 1500-watt linear amp, internal tuner, and power supply in its separate cabinet.

Q: When is the KPA1500 expected to begin shipping?

A: First customer shipments are expected to begin in mid-to-late December 2017.

Q: Why has the date changed to mid-to-late December?

A: Our amplifier team has found a way to significantly reduce the fan noise of the switching module by using different fans with a much quieter noise profile. The new design cools the power supply more efficiently, and has a more pleasant sound than the stock fans. Our test operators love the change, so we've decided to phase it into production immediately. As a result, first shipments will begin in mid-to-late December. This is in keeping with our goal to give our customers the best possible amplifier

Q: Is the KPA1500 offered factory assembled and in kit form?

A: Initially it will be available in Factory-built form only. Expect to see a kit version released 90 to 120 days after first customer shipment.

Q: When will the KPA1500 be available for sale outside of North America?

A: The exact date will be determined when CE certification has been completed. Expected timeline for this is to be determined.

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Q: Feature-wise, how does the KPA1500 compare to the KPA500?

	KPA500	KPA1500
Maximum rated power, 160M to 6M	**500 watts**	**1500 watts**
AC power requirements	**120V or 240V AC**	**240V AC only**
Weight	**26 lbs/12 kg**	**RF Deck: 21.6 lbs/9.8 kg** **Power Supply: 15.6 lbs/7.1 kg**
Power supply type	**Linear**	**Switching** In external cabinet, same size as RF Deck
Very compact design (dim. shown are exclusive of feet, handle, and fans)	**4.0 x 10.8 x 10.0 inches** **10.2 x 27.4 x 25.4 cm** **HWD**	**4.5 x 13.5 x 11.5 inches** **11.5 x 34 x 29 cm** **HWD**
Full integration with K3/K3S	✓	✓
Automatic band select	✓	✓
Instant on	✓	✓
Fast, silent pin diode T/R switching	✓	✓
Built-in tuner option with dual antenna jacks	**No** **(Use KAT500)**	✓
RF sensing band change	✓	✓
Remote operation capable	✓	✓
Active overdrive/SWR protection	✓	✓
User-programmable switch functions and associated control outputs	**No**	**PF1 & PF2 switches; up to 3 control signals**
Compatible with nearly any transceiver	✓	✓

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Q: What do the KPA1500 control panel and rear panel look like?

    A: The photo below shows the front panel controls. Note that the buttons use Elecraft's familiar *Tap* and *Hold* functions for access to the most-used features.

    Additionally, there is a Menu system for tailoring the KPA1500 settings to match your station requirements. Most of these need only be set up one time.

Below is a photo of the rear panel.

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Q: What connections will the KPA1500 provide for the transceiver and peripherals?

A: The rear panel of the KPA1500 includes the connectors described below.

- **USB**: Provides a virtual COM port for use with *KPA1500 Utility* and other computer-based control programs.

- **Ethernet**: For local and remote operation applications.

- **XCVR Serial**: For connections to Kenwood serial and Icom CI-V data streams to determine band and frequency. This provides Enhanced Mode operation where the KPA1500 knows what band you've selected on your transceiver. Can alternatively be used as a low-current on/off control output.

- **TUNE**: Input that allows the KPA1500's ATU to interact with an Icom remote tuner connection, found on many Icom transceivers. This provides Enhanced Mode operation where the KPA1500 knows what band you've selected on your transceiver. Can alternatively be used as a low-current on/off control output.

- **AUX**: A 15-pin jack for use with the K3 or K3S for Enhanced Mode operation. This fully integrates the KPA1500 with the K3 or K3S. Includes an ALARM output that can also be used as a general purpose on/off output.

- **KEY IN**: Used with any transceiver to key the amplifier. Pulling KEY IN to ground causes the KPA1500 to be placed in transmit mode. (Normally pulled up to 5 volts DC through a 10 K resistor.)

- **ALC Out:** Provides a negative-going voltage to transceivers that require this feature. Elecraft radios do not require ALC to operate properly.

- **REM**: A 12-volt input signal for use in remote operation applications. This signal can be used to power on/off the KPA1500 with 12 volts DC applied to this connection.

- **Control**: Contains signals for the amplifier to communicate with its separate power supply.

- **HV Supply**: High voltage / high-current cable for the amplifier. Nominally 50 V, 50 A.

- **Ground**: For attaching the KPA1500 to station ground.

- **TX Sample:** Provides a low level KPA1500 TX RF signal for sampling use by transceivers that support closed-loop pre-distortion techniques, e.g. *Pure Signal*. This low-level signal of -60dBm is taken directly from the amplifier's directional coupler.

- **RF Input**: Connects to your transceiver's RF output.

- **ANT 1 and ANT 2**:   Dual RF output ports. When used with the internal 1500 watt tuner, the result of successful full cycle tunes are remembered on a per-port basis. This makes it easy to quickly QSY between antennas and recall the tuning elements needed immediately. Further, you can establish preferences for which ANT port to select when QSY'ing between bands. This allows you to pre-select what antennas you want assigned to each band.

Q: What does the power supply cabinet look like and how do I know it is on?
   A: The power supply is shown below. It is the same size as the KPA1500 RF deck. There are three LEDs to show power supply operating status. The power supply can optionally be placed some distance away from the RF deck, e.g. on the floor or in any well-ventilated location. The standard power supply cable is 5.5 feet long.

Q: Does the KPA500 stay in the product lineup now that the KPA1500 has been announced?
   A: Yes. The KPA1500 and the KPA500 support different customer needs.

Q: Now that there's the KPA1500, will there be continued enhancements for the KPA500?
   A: Yes. Elecraft will continue to produce, support, and enhance the KPA500.

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KPA1500 Options, Cables and Cabinets

Q: What cables and accessories come in the box with the KPA1500?

    A: While the AC power cable is permanently attached to the power supply cabinet, the plug end is adaptable to work with NEMA receptacles in various parts of the world. Depending on your location, you will need to install a suitable NEMA plug. These can be selected when the amp it ordered.

    There is also a USB-A to USB-B cable to connect the KPA1500 to a computer for remote control or for use with the KPA1500 Utility.

    Additionally, a keying cable will ship with the KPA1500. The keying cable is an RCA-to-RCA cable for use with transceivers to enable the KPA1500 for transmit.

Q: What are the available options for the KPA1500?

    A: The KPAK3AUX cable kit is available for connection to a K3 or K3S.

Option	Description	What do I need to order?
KPAK3AUX cable kit	A series of 2 adapters and a 15-pin cable for use with the K3/K3S series of radios. [Manual available here]().	KPAK3AUX

Q: How is the AC cable made to accommodate international AC outlets?

    A: For any market outside of North America, the KPA1500 will ship with bare wires on the AC cable. The cable is permanently mounted to the power supply so there will be no need to open the cabinet for installation of the AC plug.

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Q: What AC cable plug do I need to plan for?

A: The AC cable itself is permanently installed into the Power Supply cabinet. You only need to install the proper AC plug suitable for your local electrical code requirements. The AC cable will be terminated with stripped wires for an AC plug to be installed.

All KPA1500 amplifiers shipped into the North American markets will have a NEMA 6-20P plug pre-installed on the AC cable.

All worldwide shipments will have an AC cable shipped with bare wires for attachment to the plug.

Note: Please check your local building codes. The information above may have additional specifications and limitations specified by region, state, province or local authorities.

Q: What AC circuit ratings should I plan to have available to run the KPA1500?

A: You should plan to have a 200-240 volt, 20 amp drop from the load panel to the KPA1500.

Q: Does the KPA1500 include an internal tuner?

A: Yes. The KPA1500 the internal tuner system is part of the amplifier. The KPA1500 is not available without the internal tuner. It uses the same proven low-pass L-network technology as other Elecraft automatic antenna tuners.

Q: Are the RF deck and power supply cabinets the same size?

A: Yes. Each case measures 4.5 x 13.5 x 11.5 inches (41.5 x 34 x 29 cm) HWD, less fans, feet, and handle.

Q: How are the 2 cabinets connected?

A: There are 2 cables connecting the cabinets together:
1) A +50 volt DC power cable using high-current, high-retention-force Anderson Power Pole connectors at each end.
2) A control cable containing the signals needed for the RF deck's Master Control Unit (MCU) to monitor and control the power supply.

Q: How far apart may I place the Power supply and Amplifier cabinets?

A: Both KPA1500 cables are 5.5 feet (1.6 meters) in length; suitable for use in a typical shack where the power supply may be placed in a more convenient location. Longer cable lengths may be offered in the future.

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KPA1500 Technical Details

Q: What is the amplifier circuit topology of the KPA1500?
  A: The KPA1500 uses dual LDMOS output devices configured in a push-pull output configuration. Each device is rated at 1400 watts. We have designed the KPA1500 to accommodate multiple vendor devices to maintain highest reliability.

Q: How is the transition from receive to transmit handled in the KPA1500?
  A: Like all Elecraft's amplifiers, the KPA1500 uses PIN diode switching. This provides lightning-fast T/R while remaining silent, unlike less-reliable (and noisy) relay switching. To protect the amp and T/R switch, we use heavy-duty PIN diodes, very high reverse voltage, and virtually instantaneous detection of high SWR. All possible catastrophic load scenarios have been extensively tested.

Q: What output devices are used?
  A: The KPA1500 uses two dual-section LDMOS devices, operating at 50 volts nominal. The use of two devices rather than one allows for improved thermal transfer, as discussed in the next item.

Q: How is heat managed in the KPA1500's RF deck?
  A: The KPA1500 has a large, custom heat sink extrusion and thick copper spreader, both optimized for our packaging. We also use two LDMOS devices rather than one, allowing heat to be laterally distributed more efficiently. There are three large, deep fans. The center fan is controlled independently so it can turn on first, at lower speed. In many cases that's all the operator will ever hear. Only during high duty-cycle operation are the other two fans turned on. We then carefully manage the speed of all three to minimize noise while still ensuring excellent thermal performance.

Q: What is the expected duty cycle for the KPA1500?
  A: 30 minutes at 100%. This handles all transmission needs for amateur radio use, including digital modes.

Q: How much drive power is required to achieve rated output of 1500 watts? What should I expect for QRP radios of 10 watt output?
  A: 50 watts input, typical for full output on all bands, per FCC requirements. Since it is a linear power amplifier, QRP radios can be connected to the KPA1500. At 10 watts input, output should be about 300 watts or better.

Q: Why is the KPA1500's power supply in a separate enclosure?
  A: Separating the power supply from the RF deck provides three advantages: (1) This dramatically reduces the size of the RF deck unit, which is typically located at the operating position. The two units are both very compact, allow ease of installation and handling. (2) The separate power supply can be cooled optimally by its own fans and thermal management system, without contributing heat to the RF deck. (3) All high-voltage AC circuitry is located within the power supply cabinet, making RF deck maintenance safer and more convenient.

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Q: What is the output level of the TX SAMPLE port?

A: Coupled from the amplifier output, the TX SAMPLE signal output level is -60dBm.

Q: Can the KPA1500 be used in an SO2R configuration?

A: Yes, provided that a suitable external switching unit is used. SO2R, done correctly, requires extensive path shielding, switching components, and control circuitry. Adding these internally would have increased the size and cost of the KPA1500 for all customers. Instead, the KPA1500's firmware will fully support third-party SO2R products as required. (Also see item below.)

Q: Is there a convenient way to use two transceivers or external antenna switches with the KPA1500?

A: Yes. The KPA1500 provides two user-programmable switch functions, PF1 and PF2, as well as up to 3 on/off control outputs. These could be used to control an external (third-party) dual-rig switch, antenna switch, SO2R switch, etc. In addition, the KPA1500 provides multiple serial interfaces for sequencing and automation via radios or computer software. The amplifier's firmware will be updated as required.

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Operation with the Elecraft K3/K3S

Q: How is the KPA1500 connected to a K3 or K3S?

    A: The KPAK3AUX cable kit provides all the cables required. This cable kit will enable Enhanced Mode operation where the K3 or K3S is able to interact with the KPA1500 for fully integrated operation.

    For instance, the K3 or K3S can detect when the KPA1500 is in OPER or STBY mode and will adjust its RF output automatically to accommodate the lower RF drive required by the KPA1500. Then, it can return to 'barefoot' mode output when the KPA1500 is placed in STBY mode.

    Further, the band select buttons on the KPA1500 will control band selection on the K3 and K3S, since the radio and linear amp are in constant communication. Likewise, the internal tuner can monitor the VFO frequency of the K3 and K3S. This allows it to pre-select the tuning elements memorized from prior tuning cycles, supporting fast search-and-pounce operation.

Q: May the KPA1500 be operated outside the ham radio bands for MARS or other similar functions? Are there any limitations?

    A: The KPA1500 can be used for MARS, Civil Air Patrol or other commercial applications requiring extended ranges outside of ham band allocations. Per FCC rules, however, the KPA1500 will not operate in the 11 meter band.

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Using the KPA1500's internal antenna tuner

Q: What is meant by "the internal tuner is rated up to 3:1 SWR at 1500 watts while it can handle up to a 10:1 SWR in amplifier bypass mode"?

A: The internal tuner in the KPA1500 will handle SWR levels inversely proportional to power output, primarily constrained by reflected power. That is, we rate the internal tuner at 1500 watts output while working into an antenna and transmission line system at least 3:1 SWR, and 500 watts at 10:1 SWR. When the amp is bypassed, the tuner can still be used just with the exciter, and the 10:1 limit applies.

Q: How will I know when to use the internal tuner? How does the KPA1500 handle high-SWR antennas?

A: The KPA1500 will try hard to work with high-SWR antennas. If the SWR is too high for your target power level, the amp will either drop back a few dB and keep on going, or fault and go to bypass, depending on just how far over the allowed reflected power you get. The allowed forward power will vary with SWR. For the best transfer of RF power to the antennas system, plan on engaging the internal tuner when SWR rises above about 1.5:1.

Q: Is the internal antenna tuner operational in receive mode?

A: Yes. With some antennas this may provide a small improvement in signal strength, or better rejection of adjacent bands, due to optimal match between the antenna and transceiver.

Q: Can the antenna tuner be easily bypassed?

A: Yes. The antenna tuner may be bypassed via a front panel control, separately from the power amplifier itself, on a per-band and per-antenna basis.

Q: How many memories does the antenna tuner have? How are these used?

A: The KPA1500's antenna tuner provides over 1600 frequency "bins" to effectively cover the entire 160 through 6 meter range. Each bin can store as many as 32 separate tuning solutions for the antenna tuner's L-network, for a total of over 51,000 tuning solutions. This allows rapid re-tunes even in the case where more than one antenna can be used on a given band.

Q: May I use the KPA1500 with a KAT500?

A: There is no need to use a separate, external tuner since the KPA1500 already has an integrated, internal 1500-watt tuner.

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KPA1500 Operation with Other Popular Radios

Q: How do I hook up the KPA1500 to my non-Elecraft radio?

    A: Please use this table to determine how you can hook up your radio.

- *See notes below these tables defining Basic and Advance Mode operation.*

Icom

Model	Basic Mode	Enhanced Mode	Cables available from Elecraft? **
IC7300	✓ Cable included with purchase	✓	No **
IC-746/756 series	✓ Cable included with purchase	✓	No **
IC-7410/7600 series	✓ Cable included with purchase	✓	No **
		** 3rd party custom cable maker available	

Kenwood

Model	Basic Mode	Enhanced Mode	Cables available from Elecraft?**
TS-590 series	✓	✓	No **
TS-2000	✓	✓	No **
TS-570 series	✓	✓	No **
TS-990	✓	✓	No **
		** 3rd party custom cable maker available	

Yaesu

Model	Basic Mode	Enhanced Mode	Cables available from Elecraft?**
FTdx5000	✓	✓	No **
FTdx3000	✓	✓	No **
FTdx1200	✓	✓	No **
FTdx3000	✓	✓	No **
FT-897/857	✓	✓	No **

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		** 3rd party custom cable maker available

Flex

Model	Basic Mode	Enhanced Mode	Cables available from Elecraft?**
6700	Cable shipped with the KPA1500	Use DDUtil	Yes, Basic mode
6600	Cable shipped with the KPA1500	Use DDUtil	Yes, Basic mode
6500	Cable shipped with the KPA1500	Use DDUtil	Yes, Basic mode
6400	Cable shipped with the KPA1500	Use DDUtil	Yes, Basic mode
6300	Cable shipped with the KPA1500	Use DDUtil	Yes, Basic mode
5000	Cable shipped with the KPA1500	Use DDUtil	Yes, Basic mode
3000	Cable shipped with the KPA1500	Use DDUtil	Yes, Basic mode
		** 3rd party custom cable maker available	

Q: What is meant by Basic and Enhanced connection modes?

A:

Basic mode connection uses only the KEY signal and RF from the transceiver to 'arm' the KPA1500 for transmit when the transceiver goes into transmit. This approach uses the KPA1500's ability to read the RF frequency on the VFO dial as you just begin to transmit. Basic mode, therefore, depends on just a brief sample of RF in order to quickly and smoothly change bands.

Enhanced mode connection uses one of various communication interfaces to determine what the VFO frequency or band is *before* the transceiver goes into transmit. While the communication method varies by the maker of the radio, they all serve to tell the KPA1500 how to prepare itself prior to transmitting. For DXers and Contesters, you can move quickly between frequencies in the same band or QSYing across bands.

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KPA1500 Remote Operation

Q: Will I be able to use the KPA1500 in a Remote station with Elecraft radios?
　　A: Yes. It has been designed to be operated remotely, supported by a variety of interfaces and a rich remote-control command set.

Q: Will the KPA1500 work with the K3 Remote System?
　　A: Yes. The Elecraft K3 Remote System will be supporting the KPA1500 in future releases.

Q: Are there special cables needed to operate the KPA1500 remotely? How do I order them?
　　A: Yes. Expect more complete remote features to be delivered in future firmware releases.

Q: **Is the KPA1500 FCC Certified now?**
　　A: Yes, the KPA1500 has been certified by the FCC. We're taking orders now.

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